FLORA
OF
WEST TROPICAL AFRICA

THE BRITISH WEST AFRICAN TERRITORIES,
LIBERIA, THE FRENCH AND PORTUGUESE
TERRITORIES SOUTH OF LATITUDE 18° N. TO
LAKE CHAD, AND FERNANDO PO.

BY
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SECOND EDITION
REVISED BY
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PREPARED AND REVISED AT THE
HERBARIUM, ROYAL BOTANIC GARDENS,
KEW, UNDER THE SUPERVISION OF THE
DIRECTOR.

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FOREWORD

In the provision by the Royal Botanic Gardens, Kew, of Floras for the different regions of the Commonwealth, the need for area Floras to supplement the " Flora of Tropical Africa " is due in part to the necessarily very general character of that great work, but even more to the copious additions to our knowledge since most of the " Flora of Tropical Africa " was published.

A " Flora of West Tropical Africa " was in consequence projected to include the area comprised by the British West African Colonies, the British Cameroons, the French and Portuguese Colonies south of the Tropic of Cancer to Lake Chad and Fernando Po. This work, under the auspices of the Colonial Office and financed by the four British West African Governments, was prepared at Kew by J. Hutchinson and J. M. Dalziel and appeared during the decade 1927–1936. The seventeen years or more that have elapsed since then have witnessed not only greatly augmented exploration and extensive collections over the entire region, amongst which Mr. Keay's own contributions from Nigeria are noteworthy, but also substantial increases in our knowledge of the taxonomic aggregates concerned, and this has been further stimulated by the work upon the " Flora of Tropical East Africa " which is now in course of preparation at the Kew Herbarium. In view of the need for extensive revision and for an incorporation of all the additional information that has accrued, also from the fact that the Flora of Hutchinson and Dalziel is now out of print, this new edition has been rendered imperative. The Nigerian Government generously expressed their willingness to attach Mr. Keay to Kew Herbarium for the purpose of preparing this new edition—a particularly fortunate circumstance since in addition to being an experienced taxonomist, Mr. Keay already possessed an extensive knowledge of the flora of the region and was thus in a position to assess the more urgent needs in any such task.

It is important to emphasize that any Flora is an attempt to portray existing knowledge at the time of its production. It can never be definitive, and the more it brings into prominence the gaps in our knowledge that need to be filled, the more successful it may be deemed to be. Many groups need revision, but only the more urgent of these tasks can be undertaken in any Flora, otherwise publication would be so long delayed that students would be deprived of an essential tool, and much of the information would be out of date by the time the work appeared. A Flora is therefore of necessity a compromise between what is theoretically desirable and what can in practice be achieved. But even more it is inevitably a temporary assessment of an ever-changing scene which, the more successful its objective the more rapidly will it become out of date by the stimulus it has provided towards further floristic studies of the area. Some idea of the wealth of new material that has accrued may be conveyed by reference to one or two groups. Thus in the genus *Polygala* 24 species are now included as compared with 15 in the first edition, whilst in the family *Podostemaceae*, in place of the 2 genera each with a single species, we now have no less than 18 species representative of 6 genera.

Further illustrations, mostly by Miss Stones, have been provided for this edition which have likewise been specially prepared for the purpose.

Mr. Keay's efforts will, we believe, provide a stimulus to further investigation of the flora, and no one will be more pleased than he if the present work leads to such extension of our knowledge of the vegetation of this area as rapidly to necessitate a further edition.

Thanks are due to numerous botanists, both amateur and professional, forest officers and other government officials, in the West African Colonies for providing specimens utilized in compiling this Flora. Kew is also indebted for facilities of various kinds to the following Institutions: The British Museum (Natural History), Department of Botany, Oxford University, the Muséum National d'Histoire Naturelle, Paris, the Jardin Botanique de l'État, Bruxelles, the Universitets Botaniske Museum, Copenhagen, the Botanisches Museum, Berlin-Dahlem, and not least to the co-operative assistance of the Colonial Office and the Colonial Governments concerned. To all who have helped us I would tender my gratitude for their ungrudging assistance.

E. J. SALISBURY.

ROYAL BOTANIC GARDENS, KEW,
April 1953.

REVISOR'S PREFACE

In 1951 the Secretary of State for the Colonies, on behalf of the four British West African territories (Nigeria, Gold Coast, Sierra Leone and Gambia), and with the advice of the Director of the Royal Botanic Gardens, Kew, arranged for the preparation of this revised edition. Volume I, Part 1 of the Flora was published in 1927 and the last part (Volume II, Part 2) in 1936. Stocks of complete sets became exhausted in 1950 and it was generally agreed that the preparation of a revised second edition would be the only satisfactory way of meeting the increasing demand for an up-to-date " Flora of West Tropical Africa."

Of the original authors, Dr. Dalziel died in 1948 and Dr. Hutchinson retired from the staff of the Royal Botanic Gardens, Kew, in the same year. Unfortunately, owing to heavy commitments on the preparation of a " Flora of Tropical East Africa," it was quite impossible for the Director to spare a member of the Kew staff for the work of revising the West African publication, though the staff of the Herbarium are willingly giving such aid as they can. The Government of Nigeria therefore agreed with the suggestion, made by the Secretary of State and the Director, that I should be attached to the Royal Botanic Gardens, Kew for the purpose of preparing a revision of the " Flora of West Tropical Africa." The cost of this revision is being shared by the four British West African Governments.

Dr. Hutchinson, although retired, is still frequently in the Kew Herbarium and has very kindly advised on various points, particularly in matters concerning the sequence and concept of the families of flowering plants.

In this revision the northern limit of the area of the Flora has been moved southwards from the tropic of Cancer to latitude 18° N. This has excluded a number of Saharan species which belong to a floristic region quite distinct from that compassed by the rest of the Flora. The flora of the desert, or semi-desert, country between latitude 18° N. and the tropic of Cancer was poorly known when the first edition of the " Flora of West Tropical Africa " was being prepared, and was of necessity rather inadequately dealt with. In recent years, however, French botanists have added considerably to our knowledge of this area, but their specimens are scarcely at all represented in the British herbaria, and no botanist working in this country could do justice to the Saharan flora.

For this edition several botanists have very kindly contributed certain families and groups which appear under their names in the text of the Flora. Mr. V. S. Summerhayes, who contributed the *Orchidaceae* in the first edition, is revising the family for this edition.

Many others have assisted and advised in various ways, particularly the staff of the Kew Herbarium, of the Herbarium of the British Museum (Natural History), of the Forest Herbarium, Oxford, and of the Laboratoire de Phanerogamie, Muséum d'Histoire Naturelle, Paris ; I am most grateful to them.

I have, however, been responsible for the revision of the bulk of the Flora, and botanists will appreciate that, in view of the limited time available, my revision has not always been as thorough as I could have wished. It has always been necessary to compromise between the requirements of speed and of accuracy. In some genera a fairly thorough revision has been possible, while in others I have followed the first edition without significant change. From time to time, I have drawn attention to the existence of imperfectly known species and of other problems, in the hope that further collecting and research may solve some of these outstanding problems.

There has been a great increase in botanical collecting in many parts of West Africa since the first edition was published, and the additional material incorporated in this revision is considerable. It would, however, be unfortunate if the appearance of this edition were to create an illusion of finality. A Flora such as this can only represent the best summary of the material available which can be made in the time available.

The first edition of this Flora, despite its shortcomings, has proved a most valuable work, as I myself have found when working in Nigeria and, by contrast, in parts of tropical Africa which have no such Flora. My hope is that the revised edition will prove even more useful by virtue of being more comprehensive.

R. W. J. KEAY.

ROYAL BOTANIC GARDENS, KEW,
March 1953.

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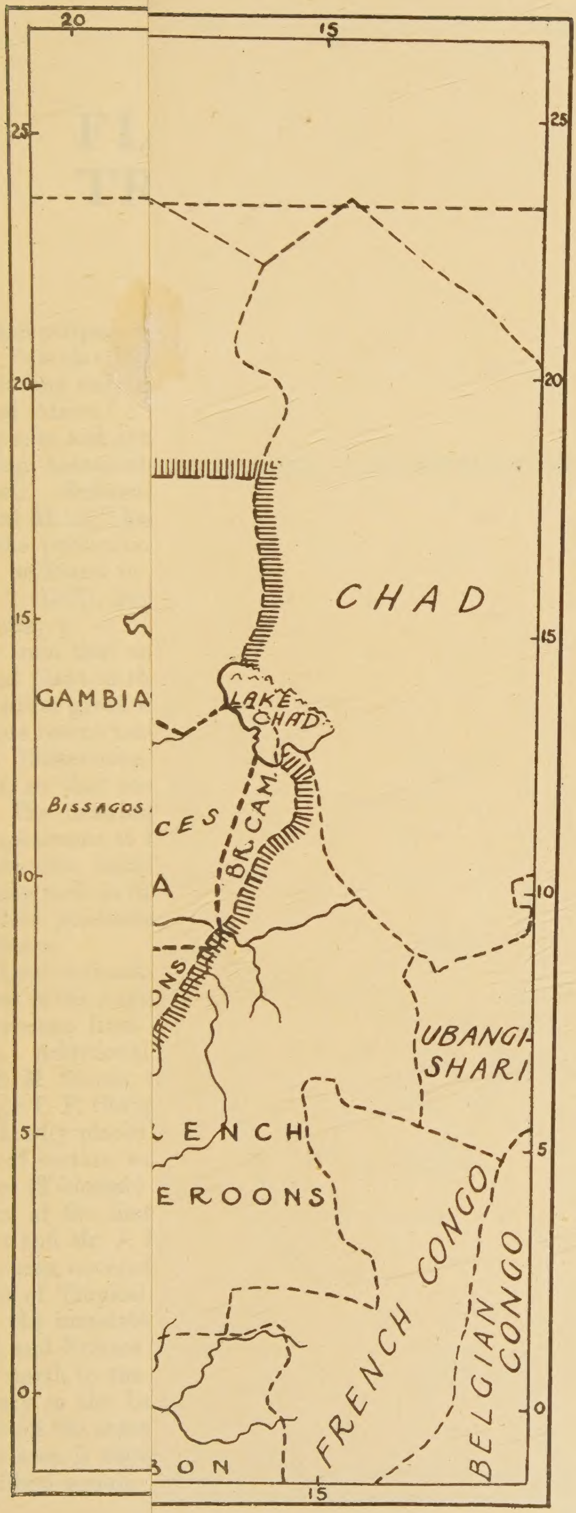
LIST OF ABBREVIATIONS

Literature. Only the more commonly cited works are listed here.

Aubrév. Fl. For. C. Iv. = A. Aubréville, La Flore Forestière de la Côte d'Ivoire.
Aubrév. Fl. For. Soud.-Guin. = A. Aubréville, Flore Forestière Soudano-Guinéenne.
Bull. Jard. Bot. Brux. = Bulletin du Jardin Botanique de l'État, Bruxelles.
Bull. Mus. Hist. Nat. = Bulletin du Muséum National d'Histoire Naturelle.
Bull. Soc. Bot. Fr. = Bulletin de la Société Botanique de France.
Cat. Talb. = Catalogue of Talbot's Nigerian Plants.
Cat. S. Tomé = A. W. Exell (and others), Catalogue of the Vascular Plants of S. Tomé (with Principe and Annobon).
Cat. Welw. = Catalogue of the African Plants collected by Dr. F. Welwitsch.
Chev. Bot. = A. Chevalier, Exploration Botanique de l'Afrique Occidentale Française.
Chev. Fl. Viv. = A. Chevalier, Flore vivante de L'Afrique Occidentale Française.
Consp. Fl. Ang. = Conspectus Florae Angolensis.
DC. Prod. = De Candolle, Prodromus Systematis naturalis Regni vegetabilis.
Engl. Bot. Jahrb. = Engler, Botanische Jahrbucher fur Systematik, Pflanzengeschichte und Pflanzengeographie.
Engl. Monogr. Afr. = Engler, Monographieen Afrikanischer Pflanzen-Familien und -Gattungen.
Engl. Pflanzenr. = Engler, Das Pflanzenreich.
Engl. Pflanzenw. Afr. = Engler & Drude, Die Vegetation der Erde, IX :—Engler, Die Pflanzenwelt Afrikas insbesondere seiner tropischen Gebiete.
E. & P. Pflanzenfam. = Engler & Prantl, Die Naturlichen Pflanzenfamilien.
F.T.A. = Oliver (later Dyer, Prain and Hill), Flora of Tropical Africa.
F.T.E.A. = Turrill & Milne-Redhead, Flora of Tropical East Africa.
F.W.T.A., ed. 1 = Hutchinson & Dalziel, Flora of West Tropical Africa, edition 1.
Fl. Congo Belge = Flore du Congo Belge et du Ruanda-Urundi.
Fl. Nigrit. = J. D. Hooker & G. Bentham, Flora Nigritiana, in W. J. Hooker, Niger Flora.
Fl. Oware = A.M.F.J. Palisot de Beauvois, Flore d'Owaré et de Benin, en Afrique.
Fl. Seneg. = J. A. Guillemin, S. Perrottet and A. Richard, Florae Senegambiae Tentamen.
Holl. = J. H. Holland, The Useful Plants of Nigeria, Kew Bulletin, Additional Series IX.
J. Bot. = The Journal of Botany, London.
J. Linn. Soc. = The Journal of the Linnean Society of London—Botany.
Johnston Lib. = H. Johnston, Liberia. Reference is usually to Stapf's List of the Known Plants of Liberia in Appendix IV to Vol 2.
Kew Bull. = Kew Bulletin (formerly the Bulletin of Miscellaneous Information).
Mildbr. Wiss. Ergebn. 1910–11 = Wissenschaftliche Ergebnisse der Zweiten Deutschen Zentral-Afrika-Expedition 1910–1911 unter Adolf Freidricks, Herzogs zu Mecklenburg, Band II : Botanik.
Notizbl. Bot. Gart. Berl. = Notizblatt des Botanischen Gartens und Museums zu Berlin-Dahlem.
Notulae Syst. = Lecomte (later Humbert), Notulae Systematicae.
Rev. Bot. Appliq. = Revue Internationale de Botanique Appliquée et d'Agriculture Tropicale.
Schum. & Thonn. Beskr. Guin. Pl. = Schumacher & Thonning, Beskrivelse af Guineiske Planter.
Trans. Linn. Soc. = The Transactions of the Linnean Society of London.

Collectors

Aubrév. = A. Aubréville.
Chev. = A. Chevalier.
Dalz. = J. M. Dalziel.
FH. = Forest Herbarium, No.
FHI. = Forest Herbarium Ibadan, No.
Hb. = Herbarium.
Hutch. = J. Hutchinson.
Jac.-Fel. = H. Jacques-Félix.
Mildbr. = J. Mildbraed.
Sc. Elliot = G. F. Scott Elliot.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FLORA OF WEST TROPICAL AFRICA

INTRODUCTION [1]

The chief purpose of this Flora is to render easy the determination in the field of the Vascular Plants of Western Africa. Considerable space has been saved by including only such synonyms as are additional to those in the "Flora of Tropical Africa." For the same reason the original place of publication of each species and synonym has also been omitted. Such would only be available in a large botanical library, and they are readily ascertainable from the *Index Kewensis*. Reference to those species more fully described in the "Flora of Tropical Africa" has been given in each case, and also to valid species described since the publication of that work. Native names, uses and economic notes are to be found in the Appendix, Dalziel's "Useful Plants of West Tropical Africa" (1937), and references to this work are shown in the text by "See Appendix, p. —." Where the botanical name used in the second edition differs from that used in the first edition care must be taken to look up the required plant in the Appendix under the name used in the first edition. The information given in the Appendix must always be interpreted in the light of the more recent taxonomical revision.

The illustrations have been included mainly for the benefit of the field worker, so that some idea may be gained of each family represented in the area. The drawings have been prepared in every case from West African dried specimens at Kew, and illustrate such species as may be easily procurable and are also fairly widely spread. A few rare plants confined to special localities, such as the Cameroon Mountain, have also been figured, either because they show interesting structural features or because of their phytogeographical importance.

We have to thank Mr. W. E. Trevithick, Temporary Assistant in the Herbarium, for most of the original drawings, in which he has sought with much care and skill to reproduce from the dried specimens the natural appearance of the living plants. Additional drawings for the second edition have been prepared by Miss E. M. Stones, to whom we are much indebted.

Major T. F. Chipp, formerly Assistant Director of the Royal Botanic Gardens, Kew, kindly placed at the disposal of the authors of the first edition his manuscript of certain woody families, *Annonaceae*, *Dilleniaceae*, *Flacourtiaceae* and *Rinorea* (*Violaceae*) which he had previously studied for another purpose. The authors of the first edition were also indebted to their colleagues Mr. C. H. Wright and Mr. J. E. Dandy for assistance with the proofs.

The area covered by this Flora is roughly that of "Upper Guinea" of the "Flora of Tropical Africa" but excluding that part of Cameroons at present under the mandate of France, and the islands of Annobon, St. Thomas (S. Tomé) and Princes (Principe) Island. It embraces all the region from Lat. 18° in the north to the coast and eastward to the boundary of the French Military Territory in the Lake Chad area (about 15° E.); it also includes the smaller islands off the coast, but not the Cape Verde Islands.

This area is shown on the accompanying sketch-map and is approximately 1·8 million square miles, i.e. about 20 times the size of Great Britain. The southern part, except for a coastal strip of grass and savannah, is covered by evergreen forest, which in the Ivory Coast reaches a depth of over 200 miles. Westward of Liberia this gives place to more open formations, whilst on each side of the Volta River a wedge of the savannah type of vegetation extends right down to the coast. The greatest development of mangrove swamp is found in the creeks of the Niger Delta, with patches here and there from Gambia to Liberia and at other points where rivers reach the sea by shallow estuaries and lagoons.

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[1] Revised for 2nd edition.

The northern edge of the forest belt, at about 6–8° N., is often fairly sharply defined, and is succeeded by high grass or deciduous forest, open woodland and grass savannah, which extend in the western part to a depth of some 400 miles. Beyond the savannah there is a gradual transition to scrub and desert conditions.

The whole area is within the tropics and the greater part of it lies at a comparatively low elevation. Thus an evergreen type of forest often lines the banks of the streams for a considerable distance within the savannah region, and gradation with subtropical and temperate types is not much in evidence. So far as latitude is concerned the Sahara forms a perfect barrier to interchange of tropical and subtropical species, whereas in the matter of altitude any connection with a temperate element is limited, as high mountain ranges are comparatively rare in this part of Africa. The greatest elevation occurs in the south-east corner, where the Cameroon Mountain reaches 13,350 ft., bearing in its upper levels a temperate flora similar to that of the high mountains of East Africa. The island of Fernando Po rises in Clarence Peak to 9,348 ft., and its flora resembles very closely that of the Cameroon Mountain. Nowhere else along the coast of Upper Guinea do forest-clad mountains occur near the sea except in the Sierra Leone peninsula, where Sugar Loaf and the adjoining mountains reach an elevation of from 2,000–3,000 ft.

The highest country inland occurs in the western part of the Ivory Coast, about 8° N., where the Nimba Mountains reach an elevation of about 6,300 ft. Here Dr. A. Chevalier [1] and other French botanists have collected some interesting species characteristic of the higher ranges of Central Africa. These mountains form the southern flank of a portion of the ancient plateau of Africa, still existing over a considerable part of French Guinea and culminating in the north in the Fouta Djalon highlands. Between this and the Bauchi Plateau in Nigeria (4,000–6,000 ft.), occur small isolated patches of high ground and lesser ranges which appear as abrupt escarpments in the savannah and occasionally in the evergreen forest. These inland mountain areas deserve special investigation, and their botanical exploration would probably yield some very interesting phytogeographical results.

The flora of the forest region shows considerable affinity with that of the great equatorial forest area of Central Africa, with which it is continuous through the Cameroons, and has also many interesting connections with that of Eastern South America. The savannah and semi-desert flora is very similar in all respects to that of the Eastern Sudan. These relationships will form the subject of a special chapter at the close of the work.

The number of species recorded is probably about 6,000, a comparatively small total as compared with some other tropical areas of equal extent. This is partly due to the general uniformity of the area coupled with its comparatively small range of elevation and depression.

In the citation of specimens the following abbreviations and sequence has been used :—

Maur. —Mauritania.
Sen. —Senegal.

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[1] A. Chevalier in *Comptes Rendus*, 149 : 458 (1908).

Gam. —Gambia.
Fr. Sud. —French Sudan (including Upper Volta).
Port. G. —Portuguese Guinea.
Fr. G. —French Guinea.
S. L. —Sierra Leone.
Lib. —Liberia.
Iv. C. —Ivory Coast.
G. C. —Gold Coast (including Ashanti and Northern Territories).
Togo —Togoland (British and French).[1]
Dah. —Dahomey.
Fr. Nig. —French Niger Colony.
N. Nig. —Northern Nigeria (political Northern Provinces).
S. Nig. —Southern Nigeria (political Western Provinces and Eastern Provinces).
Br. Cam.—British Cameroons.
F. Po —Fernando Po.

The citations have usually been limited to not more than five for each country, and where a selection has been necessary a special effort has been made to cite specimens which are available in the local West African herbaria as well as in the great European herbaria.

After each locality, the month of flowering and/or fruiting, when known, is given in brackets. A mark of exclamation after the specimen number indicates that the specimen has been seen by the revising author.

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[1] The Togo region is now administered separately under the mandates of France and Britain, but we have found it convenient to retain the name for botanical purposes.

BOTANICAL EXPLORATION IN WEST AFRICA[1]

SENEGAL, GAMBIA, FRENCH GUINEA AND FRENCH SUDAN

Adanson was the first botanist to study the flora of Senegal and the Gambia. He travelled widely in West Africa during the years 1749–54, and among other discoveries we owe to him the first exact account of the Baobab, *Adansonia digitata* (*Bombacaceae*), the tree which forms the subject of the frontispiece of this flora.

Mungo Park's first expedition in 1795–7 extended from the Gambia River to beyond Sansanding on the Upper Niger, and his second ended fatally in the Bussa rapids in Northern Nigeria. A small collection of his plants is at the British Museum, and his name is commemorated in the genus *Parkia* R.Br. (the West African Locust Bean trees, *Mimosaceae*), and in the name of the Shea Butter tree, *Butyrospermum parkii* Kotschy (*Sapotaceae*).

These were followed by several travellers and doctors, who, though not botanists, made collections of plants which were sent to Paris, and by collectors who were specially sent to West Africa to obtain material.

G. S. Perrottet, as Director of the Agricultural Station, along with M. Leprieur, a dispenser in the French Navy, arrived in 1824. During a residence of five consecutive years they made known the great majority of the indigenous plants of the coastal regions, including the Gambia and Casamance, and of the Lower Senegal River as far as Bakel. The unfinished work " Florae Senegambiae Tentamen," by Guillemin, Perrottet and A. Richard, contains descriptions and figures of many of their plants, a compilation made more complete by the work of Richard himself, gardener at St. Louis, and by Heudelot, who later became Director, as well as by the discoveries of Adanson and others.

Amongst the latter were Durand (Governor of the Colony), Geoffrey and Roussillon (a doctor), who collected towards the end of the 18th century; Döllinger, Bacle and de Beaufort (Naval Officer), all early in the 19th century, and later Dr. Brunner (a Swiss explorer, 1838), Daniell (Surgeon, 1841–53), Jardin (Inspector-General of the French Navy, 1845–8), and others, some of whom were casual collectors of plants, while some were sent for the purpose, such as Sieber. Carrey (Public Works engineer) collected plants in 1880 on the Senegal River between Bakel and Bafoulabé.

The first plants from the Fouta Djalon highlands were brought by Heudelot (1837), who was followed by Dr. Bayol (1881–3) and Dr. Bellamy (1885), all of whom penetrated from Senegal into French Guinea. The collections of M. Paroisse (of the Paris Museum) between 1893 and 1900 in French Guinea and Sudan include an important one of 200 specimens from Fouta Djalon (1893–4). Dr. Miquel (1896–7) also collected in this region, and our knowledge of its flora was extended by the mission in 1887–8 under Dr. Maclaud. The latter again collected in 1895–7, as well as M. Dybowski (1895) in the neighbourhood of Conakry. H. Pobéguin, in his " Essai sur la Flore de la Guinée Française " (Paris, Challamel, 1906), has listed and classified some 1,600 plants collected by himself in that country up to the year 1900. In recent years H. Jacques-Félix has made important collections in French Guinea. Other recent collectors include P. Jaeger, H. Des Abbayes and J. T. Baldwin.

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[1] So many collectors have been active in West Africa since 1927, that it is impossible to mention them all by name. Those mentioned are the collectors of the larger collections, but many others have made valuable contributions to our knowledge of the flora.

The first plants to be received from the Middle Niger were a few collected by the Hourst mission, which were sent to Paris in 1898.

Some 17,000 herbarium specimens were collected between 1898 and 1912 by Aug. Chevalier and his colleagues from the wider area including Senegal, French Guinea and the hinterland of the Upper Senegal, Volta and Niger Rivers (referred to as French Sudan) and from the Ivory Coast and Dahomey, and these are listed in his " Exploration Botanique de l'Afrique Occidentale Française " (Paris, Lechevallier, 1920). Specimens have also been received at Kew from French Sudan and French Niger Colony collected by Prof. O. Hagerup and by O. B. Lean.

Other collections at Kew from the Gambia were made by Ingram (about 1866) and Ozanne, and more recently by M. T. Dawe, Commissioner of Lands and Forests (Sierra Leone), and by A. Brooks, Director of Agriculture, the Gambia.

SIERRA LEONE

The earliest botanists of note who studied the flora of Sierra Leone were H. Smeathmann, associated with the scheme for settling freed slaves at Freetown, from 1771 or 1772, and the Swedish Professor Adam Afzelius, who resided there for several years (from 1792), both of whom made considerable collections. Smeathmann resided mostly in the Banana Islands, and the genus *Smeathmannia* Soland. ex R.Br. (*Passifloraceae*) is named after him. Andreas Berlin, a Swedish pupil of Linnaeus, assisted Smeathmann, and is commemorated by the genus *Berlinia* Soland. ex Hook. f. (*Caesalpiniaceae*). J. Matthews, a traveller who published in 1788 his " Voyage to the River Sierra Leone," also made a collection of plants.

G. Don collected in 1822–3 for the Horticultural Society of London, and in 1826 Miss Turner sent the remnants of a larger collection made in Sierra Leone, the majority of her plants having perished during the voyage.

The name of Dr. Daniell, who collected both in Sierra Leone and Senegal (1841–53), is retained in the genus *Daniellia* Bennett (*Caesalpiniaceae*) and in *Thaumatococcus daniellii* Benth. (*Marantaceae*), the " Miraculous Fruit of the Sudan." Dr. R. Clarke, Colonial Surgeon in Sierra Leone and in the Gold Coast (1843–63), contributed material and information regarding economic products.

T. Whitfield (1843–8) collected in Sierra Leone and the interior and in the Gambia. The genus *Whitfieldia* Hook. (*Acanthaceae*) is named after him.

T. Vogel (1841), Barter (1857), Mann (1859) and Dr. (afterwards Sir John) Kirk made collections in Sierra Leone *en route* for other destinations. Mann collected extensively on the Bagroo River.

Winwood Reade made a small collection at Regent in 1868–9. Colonel H. Halcro Johnston, R.A.M.C., sent about 65 plants to Kew in 1883 from the colony.

G. H. Garrett in 1890–1 collected up to 70 miles inland in the north-east of the colony.

G. F. Scott Elliot, Botanist on the Sierra Leone Boundary Commission, made a large collection of 4,000–5,000 specimens during the years 1891–2.

N. W. Thomas (Anthropologist 1913–14) sent abundant herbarium material to Kew from various parts of the colony, and additions from time to time have been made by officers of the Forestry and other Departments, among whom Unwin and Smythe, Lane-Poole, Burbridge, Aylmer, Dawe, and Dalziel deserve special mention.

F. C. Deighton (Plant Pathologist) has sent 5,000–6,000 specimens to Kew since the year 1926, and has added considerably to our knowledge of the flora of Sierra Leone. Other members of the Department of Agriculture who have collected actively in recent years include P. Adames and H. D. Jordan.

LIBERIA

The first botanist to visit the Liberian coast was T. Vogel, of the Niger Expedition of 1841, who spent a fortnight in the rainy month of July and collected about 150 species which are at Kew.

P. Schoenlein collected a few specimens in 1855, which were sent to Berlin. Another German, Dr. Naumann, Naturalist to the " Gazelle " expedition, made a small collection at Monrovia in August 1874 which is also at Berlin.

M. Dinklage, formerly Manager of the Woermann factory at Grand Bassa, has collected chiefly in the coastal region since 1898. His collections, which contain many new species and some new genera, continued until his death in 1935. Many of his duplicates are at Kew.

Material from inland districts was collected in 1903–4 by A. Whyte, formerly Superintendent of the Botanic Garden at Entebbe, Uganda. The locality Kakatown on many of his labels refers to a village about 50 miles behind Monrovia. Here he explored within a radius of 20 miles, and then proceeded up the Sinoe valley and in the Kroo country to about 80 miles from the coast. His 350 species are at Kew.

Other small collections have been made by D. Sim in the Sinoe region (1901), by H. Reynolds from the St. Paul River, 30 miles from the coast (1905), and by Sir Harry Johnston (1907). In 1925 a set of 427 Liberian plants, collected by Dr. O. F. Cook in 1895–6, was received for study at Kew from the U.S.A. National Museum.

In more recent years several American botanists have made collections in Liberia. D. H. Linder collected in 1926–27 and described his expedition in a " Botanical Report of Liberia " (published as part of the " Report of the Harvard-African Expedition upon the African Republic of Liberia and the Belgian Congo," 1930). G. Proctor Cooper (1928–29) collected nearly 500 specimens which are listed in " The Evergreen Forests of Liberia " by G. Proctor Cooper and S. J. Record (published in Yale Univ. For. Bull. 31, 1931). Dr. and Mrs. G. W. Harley have been collecting since 1933, and more recently J. T. Baldwin has made large collections.

IVORY COAST

The chief investigation of the flora of the Ivory Coast is of recent date and has been conducted by Aug. Chevalier and his collaborators during the years 1905–10.

Chaper, a mining engineer, brought plants and seeds to the Paris Museum in 1882. The collections of M. Pobéguin (Administrator), made between 1894 and 1897, and those of M. Jolly, who was in charge of the garden at Dabou from 1896 to 1900, are the earlier ones of most importance. The Chevalier botanical explorations have furnished some 5,000 specimens, and in particular established the scientific names and values of the forest trees (Les Végét. Utiles de l'Afr. Trop. Franç., fasc. 5, 1909, " Bois de la Côte d'Ivoire "). His work was followed up by A. Aubréville, now Inspecteur General des Eaux et Forêts des Colonies, whose "Flore Forestière de la Côte d'Ivoire" (1936) and "Flore Forestière Soudano-Guinéenne " (1950) contain a wealth of information about the woody plants of West Africa, which has been valuable in the revision of this Flora.

GOLD COAST

The earliest botanical investigations were made by the Rev. John Smyth, Minister to the Royal African Company's Factory at Cape Coast (1697), R. Planer, Surgeon (1699–1703), and J. Skeen, also a Surgeon (1703), who all sent their plants to Petiver, and by G. Bosman, the Dutch voyager, who visited the

Guinea coast and Ashanti and described the more remarkable plants in his "Voyage de Guinée" (1704).

W. Brass made a collection at Cape Coast Castle (1780–83), which he sent to Sir J. Banks; it is at the British Museum. The Danish botanist Isert carried out explorations from Accra to the Volta and Akwapim, and also in Dahomey (1783–6). Palisot de Beauvois made small collections on the Gold Coast on his way to Benin in 1786.

Thonning (Councillor of State, Denmark) lived at Accra for three years and collected in that neighbourhood and in Kwahu, Akwapim and the lower Volta. The genus *Thonningia* Vahl (*Balanophoraceae*) is named after him. His own herbarium was destroyed at the bombardment of Copenhagen in 1807; some of the duplicates, however, had been sent to the Paris Museum and to other herbaria in Copenhagen, and have been described by F. C. Schumacher in "Beskrivelse af Guineiske Planter" (Copenhagen 1827).

H. Tedlie, who was Assistant Surgeon on Bowdich's Mission to Ashanti in 1817, collected a number of plants, most of which were lost or destroyed, but a few are at the British Museum. The native names and uses of 37 medicinal plants collected by him at Kumasi are given in the published account of the expedition.

T. Vogel collected at Cape Coast and Accra and a very few miles inland on his way to the Niger in 1841.

In 1882–3 Sir A. Moloney sent plants to Kew from the Gold Coast; and in the same year Sir Richard (then Captain) Burton and Commander V. L. Cameron collected 151 specimens in the neighbourhood of Axim. About the same time a collection was made by G. Krause between Gold Coast and Togo.

On the Ashanti Expedition of 1896 Captain H. A. Cummins, Surgeon, collected 200 plants, which included several new species.

T. W. Brown sent 135 Gold Coast plants to Kew in 1900; but the largest collections of this period (1898–1902) were those made by W. H. Johnson, Director of Agriculture, amounting to some 1,100 specimens. More recently a fairly abundant supply of specimens has been received, principally from officers of the Forestry and Agricultural Departments, among whom should be mentioned H. N. Thompson, N. C. McLeod, T. F. Chipp, L. A. King-Church, R. W. Brent, W. H. Patterson, R. H. Bunting, A. W. Miles and F. N. Howes. Dalziel collected 175 species in various districts in 1919–22. A collection of 50 grasses from the Northern Territories was also made in 1924 by Captain Beal, Principal Veterinary Officer.

Chidlow Vigne of the Forestry Department collected about 3,000 specimens, mainly of woody plants, between 1925 and 1946, and is commemorated by the genus *Chidlowia* Hoyle (*Caesalpiniaceae*). Sir A. Kitson (1927–9), Director of Geological Survey, collected many specimens, mainly in the Northern Territories. T. Lloyd Williams of the Department of Agriculture collected between 1927 and 1936. Other recent collectors include F. R. Irvine of Achimota College, H. E. Box, whose specimens of *Menispermaceae*, of *Cola* and of ferns are of special importance, C. A. Thorold of the Department of Agriculture, who has made a large collection of grasses, and members of the staff of the University College, among whom C. D. Adams has made an important collection of ferns. G. K. Akpabla, J. E. Andoh and K. O. Darko have also made useful collections.

TOGO AND DAHOMEY

Isert, who travelled in the Gold Coast, also explored in Dahomey (1785) and in the adjoining Territory, afterwards German Togoland.

Père Ménager in 1874 collected some plants on the coast which are preserved at the Paris Museum. A few were also collected by Sir Richard Burton in 1863–4 on his visit to Abomey.

Most of the botanical material from these regions is of comparatively recent date. De Gironcourt collected about 130 specimens in 1908–10 in Upper Dahomey and in the Niger Valley.

In Togo considerable collections have been made by Warnecke in the coast region, and by Baumann, Buettner and Kling, Graf Zech, von Doering, Dr. Kersting, Schroeder, Mellin, Busse and Mildbraed in the inland areas. Duplicates of many of these have been sent to Kew from the Berlin Museum.

NORTHERN NIGERIA

The first Europeans to collect in what are now the Northern Provinces of Nigeria were Capt. H. Clapperton, Major Denham and Dr. Oudney in 1822–4, who arrived there after crossing the Sahara to Lake Chad. Clapperton again reached Sokoto via Badagri on the Lagos coast in 1825. The plants, collected apparently by Oudney, are at the British Museum, and include 77 species from Bornu and 16 from eastern Hausa. They were described by R. Brown in his Appendix to Denham and Clapperton's " Travels and Discoveries in North and Central Africa," pp. 208–46, with maps.

Theodor Vogel, Chief Botanist to the Niger Expedition of 1841, collected between September 11th and 17th of that year in the neighbourhood of the present Lokoja. His collections, which include some plants from Sierra Leone, Liberia and Gold Coast as well as from the Lower Niger and from Fernando Po, are at Kew and are described in Hooker's " Niger Flora." The Niger collection numbers about 300 species. Vogel was assisted by J. Ansell of the Royal Horticultural Society, after whom is named the genus *Ansellia* Lindl. (*Orchidaceae*).

Dr. Barth, of the Richardson, Barth and Overweg Expedition, during his travels in the north (1849–54), carefully observed the flora but made no collection. Edward Vogel in 1854 crossed the Sahara in search of Barth. He collected in the region of Lake Chad and was eventually assassinated in Wadai. Of his plants, which were brought to Europe by Barth, 108 specimens are at Kew and another set of 144 at the British Museum.

C. Barter was attached to the Niger Expedition under Dr. Baikie in 1857. His very large collections at Kew (and at Dublin) include material from the Lower Niger, from Epe (called by him Eppah) about 30 miles east of Lagos, and from an area vaguely described as " Nupe," but apparently including the districts adjoining the Niger at Raba, below Jebba, where Dr. Baikie had his headquarters. From here he made excursions to the tributaries and up the river as far as the lower end of the rapids. A considerable collection was also made at Fernando Po, and specimens were no doubt also collected on his return from Lagos via Ilorin to Raba, where he died in July 1859. The genus *Barteria* Hook. f. (*Passifloraceae*) was named after him.

Dr. Baikie was Surgeon and Naturalist and later Commander of the Niger Expedition of 1854, and again in 1857. His first collections up to 1859 seem to have been included with those of Barter. A small collection received in 1862 is referred to " Nupe " and probably includes plants from Lokoja, where Baikie was established as Administrator of the Settlement, and from the country around and up to Bida. The genus *Baikiaea* Benth. (*Caesalpiniaceae*) was named in his honour.

About the same period J. T. Dalton made a collection of grasses at Lokoja (1861), and from the same locality Captain A. J. Richardson in 1898 also made a collection mainly of grasses.

In 1873 G. Rohlfs travelled from the Mediterranean to Lake Chad and thence to the coast, and published an account of the journey (" Quer durch Africa," Leipzig, 1874–5).

In 1901–2 L. Kentish Rankin, Political Officer, sent to Kew 39 specimens from the "southern part of N. Nigeria."

W. R. Elliott, Conservator of Forests (1903–8), made considerable collections representative of a wide area in N. Nigeria up to Lake Chad.

P. A. Talbot and Captain G. B. Gosling collected during a survey expedition in 1904–5 from Ibi to Lake Chad via Bauchi.

Plants collected by Dalziel (1905–12) in various provinces of N. Nigeria number 1,645. The collections of H. V. Lely and those of J. Dent Young, both of the Forestry Department, are of particular value since they have thrown much light on the flora of the Bauchi Plateau, which hitherto was almost unknown.

Many other collectors have contributed material, amongst whom may be mentioned Drs. Parsons and Moiser, Medical Officers, and E. W. Foster, B. G. B. Shaw, J. Bunney and F. D. Ryan, all of the Forestry Department, P. H. Lamb, Assistant Director of Agriculture, C. C. Yates, District Officer, and A. W. Hill.

R. W. J. Keay (1944–50) has collected many specimens, and so too has R. D. Meikle (1949–50) of Kew. Several officers of the Department of Agriculture have made collections of grasses, among whom should be mentioned J. F. Ward, W. E. Freeman and Mrs. Hubbard (née D. V. Thatcher).

SOUTHERN NIGERIA

The earliest collection from the Southern Provinces appears to be one made by J. Kirkwood, a Surgeon, who sent plants to Petiver from Old Calabar (and from Angola) about 1698. The first botanical investigator was Palisot de Beauvois, who in 1786–8 explored the kingdoms of Oware (i.e. Warri) and Benin ; he also collected on the Gold Coast. His plants are described in the unfinished "Flore d'Owaré et de Benin en Afrique" (Paris, 1805–20), and are to be found at Geneva and Paris. T. Vogel, of the Niger Expedition, 1841, and Barter in 1857–9, collected on the Lower Niger in passing. The Rev. W. C. Thomson collected at Calabar between 1849–65. E. G. Irving, Surgeon, R.N., collected at Abeokuta, where he held a civil appointment in 1854–5. The genus *Irvingia* Hook. f. (*Simarubaceae*) is named after him.

The very important collections made by Gustav Mann, which are at Kew, include much material from Cameroon Mountain and Calabar, as well as some from Sierra Leone. He was sent to the Gulf of Guinea by the Admiralty, 1859–63, while British representative of Fernando Po, St. Thomas and Princes Island, Gabon and Spanish Guinea.

About the same time W. G. Milne, 1862–6, collected chiefly near Calabar and Fernando Po ; and Sir Richard (then Captain) Burton, on visits from Fernando Po, sent plants from Abeokuta, Brass and Bonny, as well as from the Cameroon Mountain and River.

Plants were also collected by Dr. Robb on the Calabar River previous to 1870.

E. Kalbreyer collected for Messrs. Veitch in the Niger Delta and the Cameroons (1877–84). The Rev. Hugh Goldie is remembered by *Pararistolochia goldieana* (Hook. f.) Hutch. & Dalz. (see fig. 23, p. 78), which he discovered in the Calabar district (1888).

Sir Alfred Moloney, Governor of Lagos, who collected during 1883 to 1896, Alvan Millson, Assistant Colonial Secretary (1890–1), Henry Millen, Curator of the Botanic Garden (1892–6), Dr. J. W. Rowland, Botanist on Sir Gilbert Carter's expedition in 1893, Chief Medical Officer in 1896, and Dawodu, an African Assistant Curator (1899), all sent plants representative of Lagos and the adjoining Yoruba country.

H. W. L. Billington was the first Curator of the Botanic Garden, Old Calabar (1893–7), and was succeeded by J. H. Holland (1897–1901), later Assistant in the Museum, Royal Botanic Gardens, Kew. About 300 specimens collected by the latter are at Kew. C. Punch, the first Superintendent of Forests, sent about 170 plants from Lagos Colony to Kew, 1900–1. His name has been given to one of the species of West African mahogany, *Khaya punchii* Stapf.

Phillips, a pupil at Lagos, also collected about 70 specimens in the colony, and others were forwarded by the Governor, Sir William MacGregor, and by Sir George Denton.

From 1905 onwards material has accumulated. Many specimens representative of the forest flora have been sent by officers of the Forestry Department, among whom may be mentioned H. N. Thompson, N. C. McLeod, R. E. Dennett, J. H. J. Farquhar, A. H. Unwin, E. W. Foster, L. A. King-Church, H. J. Sankey, J. L. Williams and H. Dodd. Dr. Lamborn, Entomologist, also collected about 70 miles east of Lagos in 1910–11. Dr. Dalziel's collections include about 400 species from Lagos and the vicinity.

N. W. Thomas, Anthropologist, sent some 1,500–1,600 specimens which he collected in 1911–12 and later, and a collection of S. Nigerian grasses was made by M. B. W. Jeffreys in 1915.

The very important collections of Mr. and Mrs. P. A. Talbot, made between 1909–12, include over 1,000 species and varieties. Nine new genera and 195 new species have been described from this collection by Rendle and Baker in their "Catalogue of Talbot's Nigerian Plants" (British Museum, Natural History, 1913). A further collection was made by Mr. and Mrs. Talbot in the Eket District in 1912–13 (E. G. Baker, in "Journ. of Bot.," 1914 : 1, 25). The genera *Talbotia* S. Moore (*Acanthaceae*) and *Talbotiella* Bak. f. (*Caesalpiniaceae*) are named after them.

In recent years many more specimens have been collected by members of the Forestry Department, the largest collections having been made by J. D. Kennedy (1928–38), A. P. D. Jones (1942–46), R. W. J. Keay (1945–51), and C. F. A. Onochie (1943–). The two Cambridge Botanical Expeditions (1935 and 1947–48) led by Dr. (now Prof.) P. W. Richards yielded many specimens, particularly the second expedition of which J. P. M. Brenan, then of Oxford, was the principal collector of flowering plants. H. J. Savory of the University College has also made collections, particularly of ferns.

THE CAMEROONS

The Cameroon Mountain and River were explored to some extent by Gustav Mann (1861–2), and by Richard Burton (1861–4). Mann's collection from the mountain, which they ascended together on one occasion in 1861, numbers over 250 species. G. Thomson, missionary, collected here between 1871–8, and the collector Kalbreyer also worked in this area.

Sir Harry Johnston collected 85 species at Rio del Rey in 1886, and from the upper slopes of the Cameroon Mountain he brought back 150 specimens, including ferns. Dr. A. H. Unwin also collected on the mountain in 1916–17.

In the Cameroons as formerly understood much work has been done by German collectors, especially by Preuss, Zenker and Staudt (1897–1902), many of whose duplicates are at Kew and at the British Museum. C. Ledermann made a botanical exploration from Duala to Garua on the Upper Benue and back in 1908–9, partly in the area now administered under Nigeria, and some of the plants collected by Preuss, Zenker and Staudt come from the region covered by this Flora.

T. D. Maitland (1927–31) made collections on the Cameroon Mountain and in the Bamenda highlands ; F. W. H. Migeod also collected in this locality during the same period. J. Mildbraed collected on the mountain and at Likomba in 1928. More recently J. P. M. Brenan and P. W. Richards (1948) of the Cambridge Botanical Expedition collected on the Mountain and in the rain forest south of Kumba where they discovered *Medusandra richardsiana* Brenan, a plant distinct enough to require a new family and order to accommodate it. Other collections in the lowland rain forest, on the mountain and in Bamenda Province have been made recently by R. W. J. Keay (1951) and other members of the Forestry Department. Despite these activities, however, much more knowledge of the flora of the lowland forest and of the highlands is required.

FERNANDO PO

The principal collections have been made by Theodor Vogel, who collected about 43 species at Clarence Cove (Santa Isabel), where he died in December 1841, and by Gustav Mann, whose Fernando Po collections (1859–61) include about 750 species, some of them from a high altitude on Clarence Peak.

Captain Richard Burton, who was Consul at Fernando Po from 1861–4, collected some plants in the island, as did also W. G. Milne (1866), Kalbreyer (1877–84), and J. Mildbraed in 1911.

Recent collections have been made by A. W. Exell, Prof. Emilio Guinea and Prof. A. S. Boughey.

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GLOSSARY OF BOTANICAL TERMS USED IN THIS WORK

abaxial, the side or face away from the axis.

abortion, suppression of parts usually present.

abruptly-pinnate, a pinnate leaf without an odd terminal leaflet, the same as paripinnate (see fig. 6A).

acaulescent, becoming stemless or seemingly so.

accrescent, increasing in length or thickness, e.g. the calyx of some plants in fruit.

accumbent, lying against, as the cotyledons (in some *Cruciferae*) with their edges against the radicle.

achene, a small dry fruit, not splitting when ripe, and containing a single seed, as in *Clematis* and *Compositae.*

acicular, very narrow, stiff, and pointed.

actinomorphic (regular), applied to flowers which may be bisected in more than one vertical plane.

aculeate, armed with prickles as distinct from thorns ; *aculeolate*, with small prickles.

acuminate (see fig. 4A).

acute (see fig. 4B).

adaxial, the side or face next the axis.

adnate, united with a member of another body or series, e.g. the ovary and calyx-tube.

adventitious buds, those produced elsewhere than in the axils of the leaves or the extremity of the branch.

aestivation, the manner in which the sepals and petals are arranged in bud (see fig. 1).

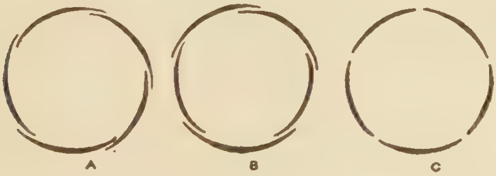

Fig. 1.—Types of Aestivation.

A, contorted.
B, imbricate.
C, valvate.

alternate, applied to leaves, etc., inserted at different levels along the branch as distinct from opposite.

amentiferous, bearing catkins.

amplexicaul, stem clasping, as when the base of the leaf is dilated and embraces the stem.

anastomosis, union of one vein with another, the connection forming a network.

anatropous, the ovule reversed, with micropyle close to the side of the hilum, and the chalaza at the opposite end.

anemophilous, wind-pollinated.

anisophyllous, the two leaves of a pair of different size or shape.

annular, used of any organs arranged in a circle.

anther, the part of the stamen which contains the pollen, usually divided into two pouches or cells.

anthesis, the time when the flower is expanded.

anticous, in position most remote from the axis.

apiculate, ending abruptly in a short point (see fig. 4G).

apocarpous, carpels free and separate from one another (see fig. 7A).

appressed, lying close and flat.

arcuate, curved like a bow.

areolate, divided into distinct spaces.

aril, an appendage covering or partly enclosing the seed and arising from the funicle (or stalk) of the seed.

aristate, with a long, bristle-like point.

articulated, jointed or separating at a certain point, leaving a clean scar.

auriculate, having an ear-like lobe or appendage at the base of a leaf or other organ (see fig. 3E).

awn, a fine bristle terminating an organ (usually applied in the case of the flowers of grasses).

axil, the angle between the leaf and the branch ; *axillary*, arising from the axil.

axile, used of the attachment of ovules to the axis or to the inner angle of the cells of a syncarpous ovary (see fig. 7D).

axis, of inflorescence, that part of the stem or branch on which the individual flowers are borne.

axis, of ovary, the central column or the central part where the inner angles of the cells (of which the ovary is composed) meet.

baccate, berry-like.

barbed, with rigid points or short lateral bristles pointing backwards.

barbellate, shortly barbed.

basifixed, of an anther attached by its base.

bearded, with a long awn, or with long or stiff hairs.

berry, a juicy fruit with seeds immersed in pulp.

bifid, cleft into two parts at the tip.

bifoliate, having two leaves ; *bifoliolate*, having two leaflets.

bilabiate, two-lipped, as when two or three lobes of a calyx or corolla stand separate as an upper lip from the others forming a lower lip.

bilocular, with two compartments or cells.

bipinnate, when the primary divisions (pinnae) of a pinnate leaf are themselves pinnate.

bisexual, having both sexes in the same flower or inflorescence.

botuliform, sausage-shaped.

bract, a small leaf subtending a flower or flower stalk.

bracteoles, small bracts on the pedicel, or close under the flower.

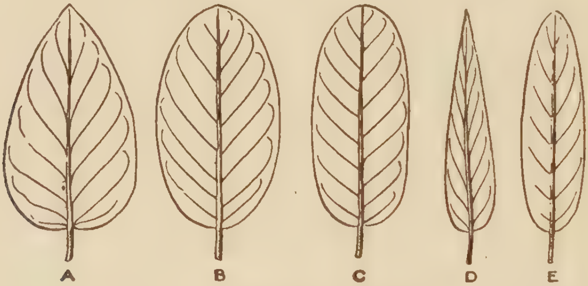

FIG. 2.—SHAPES OF LEAVES.

A, ovate. B, elliptic. C, oblong. D, lanceolate. E, oblong-lanceolate.

bullate, surface of leaves prominently raised between the veins, as in the Savoy cabbage.

caducous, falling off early.

caespitose, forming mats or spreading tufts.

calyculate, having bracts round the calyx, or an involucre resembling an outer calyx.

calyptra, a cap-like or lid-like covering of certain flowers or fruits (some *Myrtaceae*).

calyx, the outer envelope of the flower, consisting of sepals free or united ; *calyx-tube*, when the sepals are partly united the lower portion is the tube and the upper free part is the *limb* usually divided into *calyx-teeth*, *-lobes* or *-segments*.

campanulate, bell-shaped.

canescent, more or less grey or hoary.

capitate, (1) like the head of a pin as the stigma of some flowers ; (2) collected into compact head-like clusters (as the flowers of *Compositae*).

capsule, a dry fruit composed of two or more united carpels, and either splitting when ripe into pieces called valves, or opening by slits or pores.

carpel, a simple pistil formed of a fruit-leaf folded lengthwise and united by its edges, or one of several such united to form a syncarpous ovary.

carpophore, a prolongation of the torus bearing the carpels or ovary (as in *Ranunculaceae*).

caruncle, an outgrowth near the hilum of a seed.

catkin, a close bracteate often pendulous spike.

caudate, abruptly ending in a long tail-like tip or appendage (see fig. 4I).

caudicle, in orchids a stalk connecting the pollen-masses.

cauline, arising from or inserted on the stem ; *cauliflorous*, producing flowers from the old wood separate from the leaves.

cell, (1) the cavity or cavities of an ovary or fruit containing the ovules or seeds ; (2) the pollen-sac of an anther, an anther-lobe (= *theca*).

ciliate, with a fringe of hairs along the edge ; *ciliolate*, minutely ciliate.

circinate, inwardly coiled upon itself, as the leaves of *Drosera*.

circumscissile, when an organ opens as if cut circularly around, the upper part coming off like a lid.

cirrhose, having tendrils.

clavate, club-shaped, or thickened towards the end.

claw, the narrow part of a petal, etc.

cleistogamous, when fertilization occurs within the unopened flower (as in *Viola*).

coccus, a separate part of a lobed capsule (*Euphorbiaceae*).

column, (1) in orchids the adnate stamens and styles forming a solid central body ; (2) the tube of connate filaments (as in *Malvaceae*, etc.).

coma, a tuft of hairs at the end of some seeds.

commissure, the faces of cohering carpels (*Umbelliferae*).

compound, the opposite of simple ; composed of several similar parts, as a leaf of several leaflets ; *compound fruit*, when the fruits of separate flowers become united into a mass, as in *Morinda* (*Rubiaceae*) ; *compound umbel*, where each ray again bears an umbel.

compressed, flattened lengthwise from side to side (*laterally*), or from front to back (*dorsally*).

conduplicate, folded together lengthwise.

connate, when parts of the same series are united so closely that they cannot be separated without tearing.

connective, the part of an anther which connects its two lobes or cells.

connivent, when parts converge so as to be nearer together above than below.

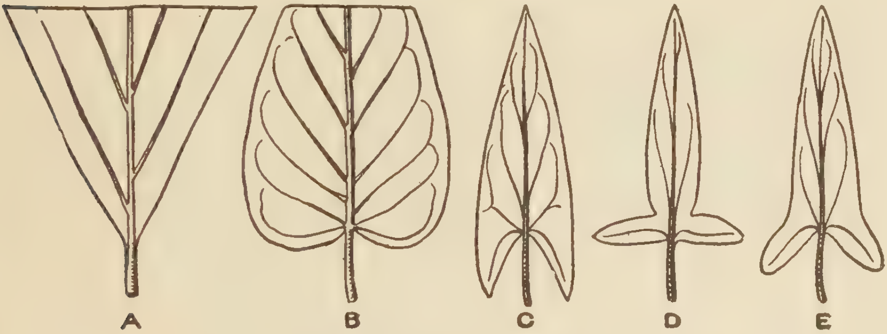

FIG. 3.—BASES OF LEAVES.

A, cuneate. B, cordate. C, sagittate. D, hastate. E, auriculate.

contorted, of sepals or petals in the bud when each overlaps an adjoining one on one side, and is overlapped by the other adjoining one on the other side (see fig. 1A).

convolute, rolled.

cordate, applied to the base of a leaf when it is more or less deeply notched (see fig. 3B).

coriaceous, firm, tough, of the consistence of leather.

corm, a kind of solid bulb or tuberous bulb-like root-stock.

corolla, the inner envelope of the flower, consisting of petals free or united.

corona, a circle of appendages between the corolla and stamens, often united in a ring or crown (as in *Passifloraceae* and *Asclepiadaceae*).

corymb, a more or less flat-topped inflorescence in which the branches or pedicels start from different points but all reach to about the same level.

cotyledon, seed-leaf.

crateriform, shaped like a cup.

crenate, the margin notched with regular blunt or rounded teeth ; *crenulate*, crenate with very small teeth (see fig. 5C).

crispate, curled.

crustaceous, of brittle texture.

culm, the stem of sedges and grasses.

cuneate, of the base of a leaf when tapering gradually, i.e. wedge-shaped (fig. 3A).

cuspidate, abruptly tipped with a sharp rigid point (see fig. 4I).

cymbiform, boat-shaped.

cyme, an inflorescence in which the central flower opens first (centrifugal), and the first branches at least are usually forked or opposite.

cystolith, mineral concretions.

deciduous, falling off eventually ; not evergreen.

declinate, bent or curved downwards or forwards.

decurrent, when the edges of the leaf are continued down the stem as raised lines or narrow wings.

dehiscent, opening spontaneously when ripe, as capsules and anthers.

deltoid, shaped like an equal-sided triangle.

dentate, the margin prominently toothed, the teeth directed outwards (see fig. 5E).

denticulate, finely toothed.

depressed, more or less flattened from above downwards or at least at the top.

diadelphous, in two bundles.

dichotomous, forking regularly into two.

didymous, of anthers distinctly two-lobed, but with almost no connective.

didynamous, in two pairs of unequal length.

digitate, a compound leaf whose leaflets diverge from the same point (the apex of the petiole), like the fingers of a hand (*Bombax*) (see fig. 6C).

dimorphic, of two forms.

dioecious, with unisexual flowers, the male flowers on one individual and the female flowers on another.

discoid, (1) like a disk or plate ; (2) applied to heads of *Compositae* without ray-flowers.

disk, (1) an enlargement of the receptacle within the calyx or within the corolla or stamens, usually in the form of a ring, cup, or cushion, often lobed or even cut up into so-called *glands* ; (2) the central flowers as compared with the ray-flowers. in a head of the *Compositae*.

dissepiment, a partition in an ovary or fruit.

distal, farther from the place of attachment, the converse of *proximal*.

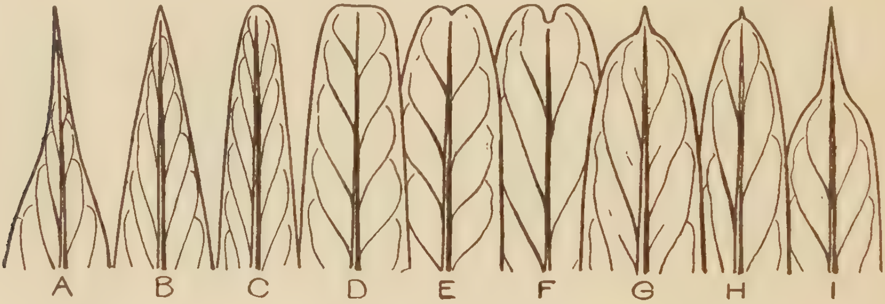

FIG. 4.—DESCRIPTION OF LEAF-TIPS.

A, acuminate. B, acute. C, obtuse. D, truncate. E, retuse. F, emarginate. G, apiculate. H, mucronate. I, caudate or cuspidate.

distichous, regularly arranged one above another in two opposite rows, one on each side of the stem.

divaricate, extremely divergent, or spreading in different directions.

dorsal, of a carpel, the back, or the face turned away from the axis ; *dorsal suture*, see *suture*.

dorsifixed, of an anther attached by its back to the filament.

drupe, a stone-fruit such as plum, cherry, etc. (*Flacourtia*, *Ximenia*).

echinate, covered with prickles like a hedgehog.

efoliate, without leaves.

ellipsoid, an elliptic solid ; *elliptic* (see fig. 2B).

emarginate, notched at the extremity (see fig. 4F).

embryo, the rudimentary plant still enclosed in the seed, consisting of the radicle from the end of which the root will develop, the cotyledons (one, two, rarely more), which become the earliest leaves, and the *plumule*, the bud from which the stem and more leaves develop.

endemic, confined to a region or country and not native anywhere else.

endocarp, the innermost layer of the pericarp.

endosperm, the nutritive material (mealy, oily, fleshy, or horny) stored within the seed, and often surrounding the embryo (formerly called *albumen*).

entire, with an even margin without teeth, lobes, etc. (see fig. 5A).

epicalyx, an involucre of bracts below the flower resembling an extra calyx, e.g. some *Malvaceae*.

epigynous, when the sepals, petals, and stamens are apparently above the ovary (see fig. 8C).

epipetalous, on the petals.
epiphyte, a plant which grows on another plant but without deriving nourishment from it, i.e. not parasitic, as some ferns and orchids growing on trees.
exocarp, the outer layer of the pericarp (of fruit).
exserted, projecting beyond, as the stamens from the tube of the corolla.
exstipulate, without stipules.
extra-axillary, beyond or outside of the axil ; *extra-floral*, away from the flower.
extrorse, of an anther which opens outwardly towards the circumference of the flower.
facultative, occasional or incidental, as opposed to essential or necessary.
falcate, curved like a scythe.
farinose, covered with a meal-like powder.
fascicle, a cluster of flowers, leaves, etc., arising from about the same point.
ferruginous, rust-coloured.
filament, the stalk of a stamen supporting the anther.
filiform, slender, thread-like.
fimbriate, with the margin bordered by long slender processes.
flexuose (*flexuous*), zig-zag, or bent alternately in opposite directions.
floccose, covered with woolly hairs.
foliaceous, leaf-like.
follicle, a pod consisting of a single carpel opening usually only along the inner (i.e. ventral) suture to which the seeds are attached.

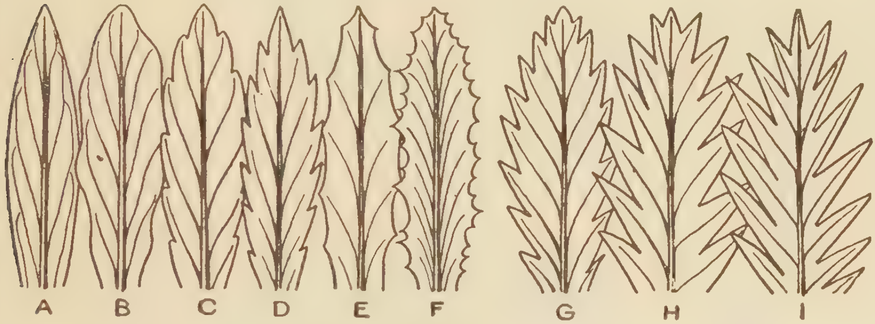

FIG. 5.—DESCRIPTION OF LEAF-MARGINS.

A, entire. B, undulate. C, crenate. D, serrate. E, dentate. F, doubly dentate. G, pinnatifid. H, pinnatilobed. I, pinnatipartite.

free, neither adhering nor united ; *free-basal placenta*, one in which the ovules are attached to a central column arising from the base of the ovary-cavity and not reaching the top, e.g. *Primulaceae* (see fig. 7F) ; *free-central placenta*, the same, but reaching to the top of the ovary, e.g. most *Caryophyllaceae* (see fig. 7E).
frutescent or *fruticose*, having the characters of a shrub.
fugacious, falling off early.
funicle, the little cord, which attaches the ovule to the placenta.
fuscous, dusky, brown rather than grey.
fusiform, spindle-shaped, thick but tapering towards each end.
gamopetalous, when the petals are united either entirely or at the base into a tube, cup, or ring.
gamophyllous, when the perianth-leaves are united.
gamosepalous, when the sepals are united.
geniculate, bent like a knee.
geophilous, on or from the ground.
gibbous, slightly pouched.
glabrous, devoid of hairs ; *glabrescent*, becoming glabrous or nearly so.
gland, (1) a secreting structure on the surface or embedded in the substance of a leaf, flower, etc., or raised on a small stalk (*glandular hairs* or *stipitate glands*) ; (2) a warty protuberance or fleshy excrescence (often on petiole, inflorescence, or within the flower).
glaucous, a pale bluish green, or with a pale bloom.
glomerate, compactly clustered.
glomerule, a small compact cluster.

glumes, lower two empty bracts, usually chaffy, as in the spikelets of Grasses.

gynaecium (pistil), the female part of the flower, consisting when complete of ovaries, styles, and stigmas.

gynobasic, when the style arises apparently from the base of the ovary (as in *Boraginaceae* and *Labiatae*).

gynophore, a stalk supporting the gynaecium and formed by an elongation of the receptacle.

hastate, of the base of a leaf when it has two more or less triangular lobes diverging laterally (see fig. 3D).

hermaphrodite, having stamens and pistil in the same flower.

heterocarpous, carpels of more than one kind.

heterogamous, when a flower-head, as in some *Compositae*, has two kinds of flowers, those of the ray being neuter or unisexual, and those of the disk hermaphrodite.

hilum, the scar left on the seed where it was attached to the funicle or placenta.

hirsute, pubescent with rather coarse, stiff hairs.

hispid, bristly-pubescent.

homogamous, when a flower-head has all the flowers of the same kind.

hyaline, almost transparent.

hypogynous, petals and stamens inserted on the receptacle below the ovary and free from it, the ovary being thus *superior* (see fig. 8A).

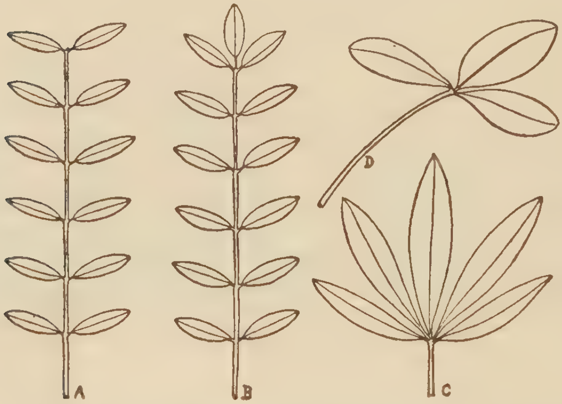

FIG. 6.—COMPOUND LEAVES.

A, paripinnate.
B, imparipinnate.
C, digitate.
D, trifoliolate.

imbricate, (1) overlapping like tiles; (2) in a flower-bud when one sepal or petal is wholly internal and one wholly external and the others overlapping at the edge only (see fig. 1B).

imparipinnate, pinnate with an odd terminal leaflet (see fig. 6B).

incised, cut rather deeply.

incumbent, lying on, as the cotyledons (in some *Cruciferae*) with the radicle against the surface.

indefinite, numerous (of stamens, etc.).

indehiscent, not opening when ripe.

indumentum, any covering, such as hairs, wool, scales, etc.

induplicate, the margins (of petals or sepals) folded inwards but not overlapping.

indusium, a cup covering the stigma, as in *Goodeniaceae*.

inferior, of a calyx which is below the ovary, the latter being then superior; of an ovary which appears to be below the calyx, the latter being adherent to the ovary and superior.

inflorescence, the arrangement of the flowers on a plant; *infructescence*, the inflorescence in the fruiting stage.

internode, the portion of stem between two nodes.

interpetiolar, of stipules placed between the petioles of opposite leaves (often connate).

intrapetiolar, between the petiole and the stem.

introrse, of an anther when it opens by a slit facing the centre of the flower.

involucre, a number of bracts surrounding the base of a flower-head or of an umbel; *involucel*, the involucre of a partial umbel.

involute, when the edges of the leaves are rolled inwards.

irregular flowers, those in which the parts of the calyx or corolla are dissimilar in size or shape, including (1) *asymmetric* flowers which cannot be divided into two equal halves in any vertical plane, and (2) *zygomorphic* flowers which are bilaterally symmetric and may be bisected in only one vertical plane.

keel, the two partially united lowest (or anterior) petals of a papilionaceous flower.

keeled, ridged along the middle of a flat or convex surface.

labellum, the lowest petal of an orchid, usually enlarged and different in form from the two lateral ones.

laciniate, cut into slender lobes.

lanceolate (see fig. 2D).

legume, the fruit-pod of the order *Leguminosae*, consisting of a single carpel, usually opening round the margin along both sutures into two halves.

lenticels, corky spots on the bark.

lenticular, shaped like a doubly convex lens.

lepidote, clothed with scales.

ligulate, strap-shaped, used of the ray-florets in many *Compositae*.

ligule, (1) the thin membranous appendage at the top of the leaf-sheath of grasses ; (2) the limb of ray-flowers in *Compositae*.

limb, the upper usually expanded part of the calyx, or corolla, which is united into a cup or tube below.

linear, long and narrow with parallel edges.

lip, (1) one of the two divisions of a gamosepalous calyx or a gamopetalous corolla when it is cleft into an upper (posterior) and a lower (anterior) portion (see under *bilabiate*); (2) of an orchid (see *labellum*).

lobulate, having small lobes.

locellate, divided into small secondary compartments.

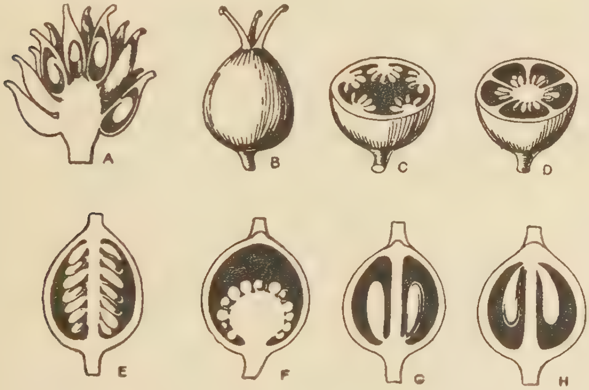

FIG. 7.

A, apocarpous pistil.
B, syncarpous pistil.
C, parietal placentation.
D, axile placentation.
E, free-central placentation.
F, free-basal placentation.
G, basal erect ovules.
H, apical pendulous ovules.

locular, having cavities or compartments, thus : *unilocular*, one-celled ; *bilocular*, two-celled.

loculicidal, opening into the cells, when a ripe capsule splits along the back (i.e. along the midrib or dorsal suture and not at the line of junction) of the carpels, e.g. in most *Liliaceae*.

lorate, or *loriform*, strap-shaped.

lyrate, of a leaf which is pinnately lobed or cut into small segments below, but with a much larger terminal lobe.

mericarp, one of the separate halves or parts of a fruit (*Umbelliferae*, etc.).

mesocarp, when the walls of a pericarp consist of three different layers, the middle one is the mesocarp ; it is often fleshy or succulent.

micropyle, a minute opening in the ovule through which the pollen-tube enters.

monadelphous, in one bundle (stamens in *Malvaceae*).

moniliform, necklace-shaped, like a string of beads.

monochlamydeous, of a flower having one whorl or perianth, i.e. calyx.

monocotyledon, a plant having a single cotyledon, or seed-leaf.

monoecious, when the male and female flowers are separate, but borne on the same individual plant.

mucronate, ending abruptly in a short stiff point (see fig. 4H).

muricate, rough, with short hard tubercles or pointed protuberances.

muticous, blunt, without a point.

nerves, the principal or more conspicuous ribs of a leaf which start from the midrib and diverge or branch throughout the blade ; the smaller branches are veins ; *nervose*, with prominent nerves.

net-veined, when the smaller veins are connected like the meshes of a net (= *reticulate*).

node, the point on the stem or branch at which a leaf or branch is borne.

nut, properly a one-seeded indehiscent fruit, with a hard, dry pericarp (the shell).

nutlet, a little nut.

obcordate, more or less heart-shaped, but with the narrow end below and the broad end deeply notched.
oblanceolate, reverse of lanceolate (see fig. 2D).
oblique, of a leaf when the two sides of the blade are unequal at the base.
oblong (see fig. 2C).
obovate, ovate with the broadest part above.
obtuse, blunt or rounded at the end (see fig. 4C).
ochreate, with an *ochrea*, i.e. a tubular stipule sheathing the stem (e.g. in *Polygonum*, see fig. 51).
opposite, (1) of leaves or branches when two are borne at the same node on opposite sides of the stem ; (2) of other organs, e.g. stamens, when opposite or placed in front of the petals instead of alternating with them.
orbicular, flat with a more or less circular outline.
oval, broadly elliptic.
ovary, that part of the pistil (the usually enlarged base) which contains the ovules and eventually becomes the fruit.
ovate, egg-shaped, of a flat surface which is scarcely twice as long as broad, with the broader end below the middle (see fig. 2A).
ovule, the immature seed in the ovary before fertilization.
pale, or *palea*, (1) one of the chaffy scales or thin colourless bracts amongst the flowers on the receptacle (*Compositae*) ; (2) of grasses, the inner of two bracts or glumes enclosing the flower.

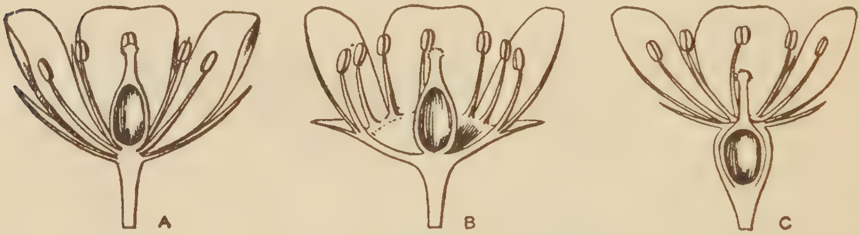

FIG. 8.—TYPES OF FLOWERS.

A, hypogynous, i.e. ovary superior ; sepals, petals and stamens *below* the ovary. B, perigynous, i.e. ovary superior ; sepals, petals and stamens *around* the ovary. C, epigynous, i.e. ovary inferior ; sepals, petals and stamens *above* the ovary.

palmate, divided into segments like the palm of the hand.
pandurate, fiddle-shaped.
panicle, an inflorescence in which the axis is divided into branches bearing several flowers.
papilionaceous, applied to flowers of the pea-flower shape.
papillose, covered with minute, nipple-like protuberances.
pappus, applied to the ring of hairs or scales round the top of the fruit of *Compositae* and representing the calyx-limb.
parietal placentation, when the ovules are attached to the inner surface of the wall of a one-celled syncarpous ovary (see fig. 7C).
paripinnate (see abruptly-pinnate and fig. 6A).
partite, cleft nearly but not quite to the base.
pectinate, like a comb.
pedate, resembling *palmate*, but the side-lobes further divided.
pedicel, the stalk of each individual flower of an inflorescence.
peduncle, the general name for a flower-stalk bearing either a solitary flower or a cluster, or the common stalk (rhachis, or axis) of several pedicellate or sessile flowers.
pellucid, translucent.
peltate, of a leaf of which the stalk is attached to its under-surface instead of to its edge.
pendulous ovule, an ovule hanging down (see fig. 7H).
penicillate, with a tuft of hairs at the end.
perfoliate, when the stem apparently passes through the blade of a leaf.
perianth, the floral envelopes, consisting of calyx or corolla or both.
pericarp, the wall of the ripened ovary ; its layers may be fused into one, or more or less divisible into epicarp, mesocarp and endocarp.
perigynous, when the sepals, petals and stamens are carried up around the ovary, but not attached to it (see fig. 8B).
perulate, of buds covered with scales.
petiole, the stalk of a leaf ; *petiolule*, the stalk of a leaflet.

phyllode, a flattened petiole or leaf-rhachis taking on the form and functions of a leaf.

pilose, hairy with rather long simple hairs.

pinna, a primary division of a pinnate leaf ; *pinnate*, of a compound leaf with the leaflets arranged along each side of a common rhachis.

pinnatifid, with the margin pinnately cleft (see fig. 5G).

pinnatilobed, pinnately divided to about half-way to the midrib (see fig. 5H).

pinnatipartite, pinnately divided almost to the midrib (see fig. 5I).

pinnule, the secondary or tertiary division of a leaf which is twice or thrice pinnate.

pistil, see *gynaecium*.

placenta, the part of the ovary, sometimes but not always thickened or raised, to which the ovules are attached.

plicate, folded like a fan.

plumose, feathered, as bristles which have fine hairs on each side, e.g. the pappus of some thistles.

pod, a dry dehiscent fruit, including (1) a *legume*, formed of a single carpel (*Leguminosae*), and (2) a *siliqua* which is two-celled, divided by a thin partition (*Cruciferae*).

pollen-mass, pollen-grains cohering into a single body (= *pollinium*).

polygamous, when a species has male, female and hermaphrodite flowers on the same or on different individuals.

polypetalous, of flowers with petals free from each other.

polystichous, when leaves are borne in many series.

posticous, in position nearest to the axis.

precocious, appearing or developing early, often used of flowers which appear before the leaves.

prickle, a sharp outgrowth from the bark, detachable without tearing the wood.

proliferous, bearing adventitious buds on the leaves or in the flowers, such buds being capable of rooting and forming separate plants.

proterandrous, when the anthers ripen before the stigmas.

proterogynous, when the stigmas are receptive before the anthers open.

proximal, nearer to the place of attachment, the converse of *distal*.

pruinose, covered with a frost-like powder or bloom.

puberulous, shortly pubescent.

pubescent, covered with short soft hairs.

pulverulent, as if dashed with powder.

punctate, marked with dots or translucent glands.

pungent, ending in a rigid sharp point.

pustulate, having slight elevations like pimples or blisters.

pyrene, a nutlet, or kernel, the stone of a drupe or similar fruit.

raceme, an inflorescence in which the flowers are borne on pedicels along an individual axis or peduncle.

radiate, of flower heads of *Compositae* with ray-flowers.

radical, of leaves which arise so close to the base of the stem as to appear to proceed from the root.

radicle (see embryo).

raphides, mineral substances in the form of needle-shaped crystals, within the cells of plants.

ray, (1) all the florets of the margin of a flower of the *Compositae* when different from those of the centre, or disk ; (2) one of the radiating branches of an umbel.

receptacle (or *torus*), the extremity of the peduncle or pedicel on which the parts of the flower, sepals, petals, stamens and pistil are inserted.

regular (see *actinomorphic*).

reniform, kidney-shaped.

repand, when the margin is uneven or wavy, with shallow undulations ; not so deep as *sinuate*.

reticulate, net-veined, when the smallest veins of a leaf are connected together like the meshes of a net.

retrorse, bent abruptly backwards.

retuse, notched (see fig. 4E).

revolute, of leaves having the margins rolled backwards towards the midrib.

rhachis, (1) the principal axis of an inflorescence ; (2) the common petiole on which the leaflets of a compound leaf are inserted ; *rhachilla*, the rhachis of the spikelet in grasses and sedges.

rhizome, a root-stock or root-like stem prostrate on or under the ground, sending rootlets downwards and branches, leaves or flowering shoots upwards ; always distinguished from a true root by the presence of buds, leaves or scales.

rostellum, in orchids a projection of the upper edge of the stigma in front of the anthers.

rostrate, beaked.

rosulate, when the leaves are in a circle at the base of the stem.

rotate, wheel-shaped, of a corolla with a very short tube and spreading limb.

rufous, reddish (of various shades).

rugose, wrinkled.

ruminate, of endosperm marked by transverse lines or divisions due to infolding of the inner layer of the seed-coat into the paler endosperm causing a marbled or mottled appearance (e.g. *Annonaceae, Myristicaceae*).

runcinate, pinnatifid with the lobes pointing towards the base.

saccate, pouched.

sagittate, of the base of a leaf with two acute straight lobes directed downwards (fig. 3C).

samara, an indehiscent one-seeded fruit provided with a wing (e.g. *Securidaca, Malpighiaceae*).

sarmentose, with long whip-like branches.

scabrid, rough to the touch, usually from the presence of very short harsh hairs.

scales, (1) reduced leaves, usually sessile and scarious and seldom green ; (2) a kind of indumentum in the form of small, flat disks attached by the centre.

scape, a leafless flower-stalk arising from the ground.

scarious, thin and dry, not green.

scorpioid, when the main axis of an inflorescence is coiled in bud, the flowers being usually two-ranked, i.e. single flowers alternately right and left.

secund, when parts or organs (branches, leaves or flowers) are all directed to one side.

segment, a part or division of an organ.

septate, divided by one or more partitions.

septicidal, when a ripe capsule splits along the lines of junction of the carpels (i.e. the lines of the placentas or dissepiments), each carpel then itself usually splitting down its ventral suture.

sericeous, silky, with closely appressed soft, straight hairs.

serrate, toothed like a saw, with regular pointed teeth (see fig. 5E).

serrulate, serrate with minute teeth.

sessile, without a stalk.

seta, a bristle, or stiff hair.

setose, beset with bristles.

setulose, a diminutive of setose.

sheath, in grasses the lower portion of the leaf clasping the stem.

siliqua, a pod divided into two cells by a thin partition, opening by two valves which fall away from a frame on which the seeds are borne (e.g. *Cruciferae*) ; *silicule*, a short siliqua, not much longer than broad.

simple, the opposite of compound ; *simple leaf*, of one blade, not divided into leaflets ; *simple fruit*, one which results from the ripening of a single carpel or ovary.

sinuate, when the margin is uneven, with rather deep undulations.

sinus, (1) recess between the teeth or lobes on a margin ; (2) angle formed by the basal lobes of a leaf.

spadix, a flower spike with a fleshy or thickened axis (e.g. *Aroideae* and some Palms).

spathe, a large bract enclosing a spadix, or two or more bracts enclosing a flower-cluster.

spathulate, spoon-shaped, broadly rounded above and long and narrow below.

spike, an inflorescence with the flowers sessile along a simple undivided axis or rhachis ; *spicate*, arranged in a spike.

spikelet, in grasses a small spike composed of one or more flowers within a common pair of glumes.

spine, a sharp-pointed hardened structure.

spinose, having spines.

spur, a slender usually hollow extension of some part of the flower.

staminode, an abortive or rudimentary stamen without a perfect anther.

standard, the large posterior petal (outside in the bud) of a papilionaceous corolla.

stellate hairs, hairs with several arms radiating horizontally.

stigma, the point or surface of the pistil which receives the pollen, either sessile (when there is no style) or on the top or surface of the style or its branches.

stipe, the stalk supporting a carpel or gynaecium.

stipellae, two small secondary stipules at the base of a leaflet.

stipitate, supported on a special stalk, or stipe, as an ovary (e.g. *Capparidaceae*).

stipules, leaf-like or scale-like appendages of a leaf, usually at the base of the petiole.

stolon, a runner which roots.

stoma (pl. *stomata*), breathing pores in the epidermis.

stramineous, straw-like or straw-coloured.

striate, marked with parallel longitudinal lines, grooves or ridges.

strigose, with short stiff hairs lying close along the surface.

strobile, a spike covered with imbricate bracts.

strophiole, an appendage to the hilum of some seeds.

style, the narrow upper part of the ovary supporting the stigma.

sub, a prefix implying somewhat or slightly, e.g. *subacute*, somewhat acute, *subentire*, having a very slightly uneven margin.

subulate, awl-shaped.

suffrutescent, like a suffrutex.

suffrutex, an undershrub, usually producing erect leafy and flowering shoots from a woody underground stock each year.

suffruticose, somewhat shrubby.

sulcate, grooved.

superior, of an ovary when the sepals, petals and stamens are inserted below it (hypogynous) ; also when the receptacle bearing the calyx, corolla and stamens is prolonged so as to be separate from the ovary, but forms a cup surrounding it (perigynous).

supra-axillary, growing above an axil.

suture, the line of junction, or seam of union, commonly used of the line of opening of a carpel ; *dorsal suture* (outer or anterior) of a carpel represents the midrib of the carpellary leaf ; *ventral suture* (inner) represents the united margins on which the ovules and placentas are borne.

synandrium, the cohesion of the anthers of each male flower.

syncarpous, composed of two or more united carpels (see fig. 7B).

tepal, a division of the perianth, sepal or petal.

terete, cylindrical, circular in transverse section.

ternate, arranged in a whorl or cluster of three ; *ternate-pinnate*, when three pinnate leaflets are borne at the summit of the main petiole ; *ternately trifoliolate*, with three leaflets attached at one point.

terrestrial, on or in the ground.

testa, the outer coat of a seed.

tetradynamous, of stamens when four are longer and two shorter, as in *Cruciferae*.

thecae, anther-cells.

thyrse, a panicle with the secondary and ultimate axes cymose.

thyrsoid, like a thyrse.

tomentellous, shortly tomentose.

tomentose, densely covered with short soft hairs.

torulose, cylindrical with contractions or swellings at intervals.

torus (see *receptacle*).

trifoliate, three-leaved ; *trifoliolate*, having three leaflets (see fig. 6D).

trigonous, obtusely three-angled.

trimerous, in threes, e.g. of a flower with three sepals, three petals, etc.

triquetrous, with three sharp angles.

tristichous, arranged one above another in three vertical rows.

truncate, cut off more or less squarely at the end (see fig. 4D).

tuber, (1) a thickened branch of an underground stem, which produces buds ; (2) a swollen root or branch of a root acting as a reserve store of nourishment.

tuberculate, covered with wart-like protuberances or knobs.

tumid, inflated, swollen.

tunicated bulb, a bulb covered with complete enveloping coats, as an onion.

turbinate, top-shaped.

turgid, swollen.

umbel, an inflorescence in which the divergent pedicels or rays spring from the same point ; *compound umbel*, where each ray itself bears an umbel, each of the latter being called a *partial umbel* ; *simple umbel*, where each ray terminates in a flower.

umbonate, bearing a small boss or elevation in the centre.

undulate, wavy on the margin (see fig. 5B).

unisexual, having stamens only or pistils only.

urceolate, urn-shaped, with a short swollen tube contracted near the top and then slightly expanded in a narrow rim.

utricle, applied (1) to the traps of *Utricularia* ; (2) to the fruits of *Cyperaceae*, etc.

valvate, when the edges of petals or sepals meet without overlapping (see fig. 1C).

valve, (1) one of the parts produced by the splitting of a capsule when ripe ; (2) in grasses the glume next to the flower.

valvule (see *palea*).

velutinous, velvety.

venation, the arrangement of the veins of a leaf.

venose, having veins.

ventral, the inner face, or the surface towards the axis ; *ventral suture* (see *suture*).

ventricose, swollen or bulging on one side.

vernation, folding of leaves in bud.

verrucose, warty.

versatile, of an anther attached by its back to the very tip of the filament so as to swing loosely.

verticil, a whorl or arrangement of similar parts in a circle at the same level ; *verticillate*, of leaves in a whorl or several arising at the same node arranged regularly around the stem.

vexillum, the uppermost (or posterior) petal of a papilionaceous flower (see *standard*).

villous, beset with long weak hairs.

viscid, sticky.
viscous, glutinous, or very sticky.
vittae, aromatic oil tubes in the fruit of some *Umbelliferae*.
viviparous, when the seeds germinate on the parent plant.
whorl (see *verticil*).
wing, (1) any flat membranous expansion ; (2) one of the two lateral petals of a papilionaceous flower.
zygomorphic (see irregular).

KEY TO THE PRINCIPAL GROUPS OF PLANTS AS ARRANGED IN THIS FLORA

Plants without flowers or seeds ; producing spores which develop into prothalli bearing the reproductive organs, antheridia (male) and archegonia (female) [1]—see Suppl. :

Plants with flowers and seeds ; pollen-grains (containing within their walls the micro-gametophytes which do not produce antheridia) represent the male gametophytes ; the embryo-sac represents the megaspore, which develops into a minute parasitic prothallus within the ovule (equivalent to the megasporangium) and after fertilization develops into a seed **(SPERMATOPHYTA) :**

Ovules not enclosed in an ovary ; plants dioecious or monoecious ; apparent flowers usually arranged (in one or both sexes) in cones of slender spikes ; no perianth ; pollen-sacs (" anther-cells ") ovoid, closely set on the lower face of the cone-scales, or (when flowers spicate) borne on free or fused filaments (*Gnetum*) ; female cone-scales imbricate, stipitate and peltate, or fertile scales solitary or paired, bearing a pair of sessile inverted ovules on the lower side ; seeds drupe-like, with a fleshy outer coat or sometimes an aril ; endosperm copious with a slender embryo ; cotyledons 2 : [2]

Leaves parallel-veined, alternate ; male flowers in cones ; shrubs or trees (**GYMNOSPERMAE**) **:**

Leaves pinnatisect, in a terminal tuft crowning the thick simple stem, circinate in bud ; sperm cells ciliate, motile ; female flowers in large cones (CYCADALES) 1. *Cycadaceae*

Leaves simple, alternate ; sperm cells eciliate, not motile ; female fertile cone-scale solitary or paired (CONIFERALES) .. .. .. 2. *Podocarpaceae*

Leaves net-veined, simple, opposite ; male and female flowers in spikes ; sperm cells eciliate, not motile ; slender climber (**CHLAMYDOSPERMAE,** GNETALES) 3. *Gnetaceae*

Ovules enclosed in a closed ovary ; flowers not or very rarely arranged in cones ; stamens usually differentiated into filament and anther ; seeds with or without endosperm ; cotyledons 2 or 1 (**ANGIOSPERMAE**) **:** [3]

Leaves usually net-veined, alternate or opposite ; floral parts mostly in fours or fives, or in multiples of these numbers, very rarely in threes or sixes (*Annonaceae* and *Menispermaceae*) ; cotyledons 2, rarely more ; herbs, shrubs or trees ; stem in cross-section showing the vascular bundles arranged in a ring or rings DICOTYLEDONES

Leaves usually parallel-veined, mostly alternate ; floral parts usually in threes or sixes ; cotyledon 1 ; mostly herbs, rarely trees ; stem in cross-section showing the vascular bundles scattered and not arranged in regular rings MONOCOTYLEDONES

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[1] These plants, usually known in the past as the Pteridophyta, will be dealt with in a Supplement, which is being prepared by Mr. A. H. G. Alston at the British Museum (Nat. Hist.).

[2] This description and the key to the Gymnospermae and Chlamydospermae applies only to the species occurring in the area dealt with in this Flora.

[3] The keys to the families of Angiospermae will be given at the end of Volume II so that all the families represented in the revised Flora can be included.

PHYLOGENETIC SEQUENCE OF ORDERS (COHORTS) AND FAMILIES CONTAINED IN VOL. I, PART 1

(The cross-lines show breaks in affinity)

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Coniferales

2. Podocarpaceae, p. 32.

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Gnetales

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[1] The families *Linaceae* and *Zygophyllaceae*, which were included in this order in the first edition have, following the advice of Dr. Hutchinson, been transferred to the order *Malpighiales* and will be dealt with in Vol. I, Part 2 of this edition.

GYMNOSPERMAE

1. CYCADACEAE

Shrubs or small trees with thick, usually simple stems and a crown of pinnatisect leaves circinate in bud ; leaflets often with spiny teeth. Cones dioecious. Males terminal or subterminal, composed of numerous leathery or fleshy flat or peltate scales bearing on the under-surface numerous pollen-sacs. Female cones similar, the scales bearing a pair of inverted nude ovules on the lower side. Seeds large, drupe-like, with copious endosperm ; cotyledons 2.

The most ancient of the families of Gymnosperms, only one species represented in our area ; mainly found in S. Africa, Australia and Central America.

ENCEPHALARTOS Lehm.—F.T.A. 6, 2 : 346.

Stem very short, ellipsoid ; leaves pinnatisect, 1–2 m. long, up to about 25 cm. wide ; segments up to about 80 pairs, linear-lanceolate, very acute, with a few spinulose teeth on the margin, and numerous close parallel nerves ; male cones pedunculate, pale green, 30–40 cm. long including the stalk ; female cones subsessile, up to 25 cm. long ; seeds crimson when ripe .. .. *barteri*

E. **barteri** *Carruth.*—F.T.A. 6, 2 : 348 ; Bot. Mag. t. 8232 ; Pilger in E. & P. Pflanzenfam. 13 : 80 (1926) ; Chev. Fl. Viv. 1 : 3. Stem rarely over 1 ft. high and 9 in. across, covered with persistent leaf-bases clothed with cottony indumentum.
G.C.: Kwahu *Chipp* 624 ! Labolabo *Anderson* ! Upper Volta *Schonfeld* ! **Togo:** *fide* Pilger *l.c.* **Dah.:** Borgu Prov. *Poisson.* Savalou *Chev.* **N.Nig.:** rocky valley 3 miles S. of Jebba *Barter* 1692 ! N. of Ilorin by Jebba Road (fr. Dec.) *Meikle* 870 !

2. PODOCARPACEAE

Trees, or shrubby in some species ; leaves persistent, alternate or opposite, or absent and represented by phylloclades, very variable from acicular to broadly lanceolate. Plants dioecious or monoecious ; male flowers in terminal or axillary strobili, the stamens usually many, the anthers 2-celled ; female flower solitary or paired, axillary or terminal, or in strobili with megasporophylls 1-ovuled and bracteate ; seed solitary, or paired ; cotyledons 2.

A family of 7 genera, largely of the southern hemisphere.

PODOCARPUS L'Hérit. ex Pers.—F.T.A. 6, 2 : 339.

Dioecious, very rarely monoecious ; leaves alternate (in our species) ; ovule adnate to the face of the fertile scale and usually much exceeding it, inverted, and enclosed in a false aril (*epimatium*) arising from the face of the scale and adnate to the single integument.

Receptacle well-developed, fleshy, finally bright red, obconical to subglobose, 15–18 mm. long, 15–20 mm. broad at the broadest point, with a pair of seeds (or sometimes only 1), at the distal end ; seeds subglobose, 8–9 mm. diam. ; leaves linear-lanceolate, 5–10 cm. long, 6–16 mm. broad, with stomata on one side of the leaf only 1. *milanjianus*

Receptacle not large and fleshy ; seeds solitary, pyriform, 2·5–3·8 cm. long ; leaves linear, 6–16 cm. long, 4–11 mm. broad, with stomata on both surfaces .. 2. *mannii*

1. P. **milanjianus** *Rendle*—F.T.A. 6, 2 : 340 ; Pilger in E. & P. Pflanzenfam. 13 : 247 (1926) ; Chalk, Burtt Davy & Desch in For. Trees & Timbers Brit. Emp. 1 : 24 (1932). A shrub, or tree up to 100 ft. high ; male cones flesh-pink about 1 in. long ; seeds glaucous, on the large fleshy scarlet receptacle ; indigenous.
Br.Cam.: Mamfe Div. (Jan.) *Lobe Babute* FHI 8797 ! Bali-Ngemba F.R. *Ujor* FHI 30326 ! L. Oku, Bamenda *Johnstone* 233/31 ! Also in French Cameroons, and widespread on the mountains of eastern Africa.

2. **P. mannii** *Hook. f.*—F.T.A. 6, 2 : 341 ; Pilger l.c. 13 : 245, t. 132 (1926) ; Chalk, Burtt Davy & Desch l.c. 1: 23 (1932) ; Dandy in Exell Cat. S. Tomé 99 (1944) ; Netta E. Gray in J. Arn. Arb. 34 : 75 (1953). A tree 30–50 ft. high ; introduced and widely planted in the Cameroons, rarely so in S. Nigeria.
Br.Cam.: Buea (fr. Dec., Jan.) *Maitland* 343 ! 345 ! *Fairchild* SPD 74656 ! Endemic to S. Tomé.

CHLAMYDOSPERMAE

3. GNETACEAE

Erect or scandent shrubs, leaves opposite, simple. Flowers in catkin-like spikes, usually dioecious ; spikes jointed, with the flowers in whorls. Male flowers with a tubular envelope of 2 connate scales ; anthers 2 or 1, sessile on the summit of a central column. Female flowers with a close-fitting utricle resembling an ovary ; ovule otherwise naked, integument produced into a straight micropylar tube exserted through the orifices of the aril and utricle, truncate, toothed or fimbriate. Seed with copious endosperm.

A small family of one genus, widely distributed in the tropics and warmer regions.

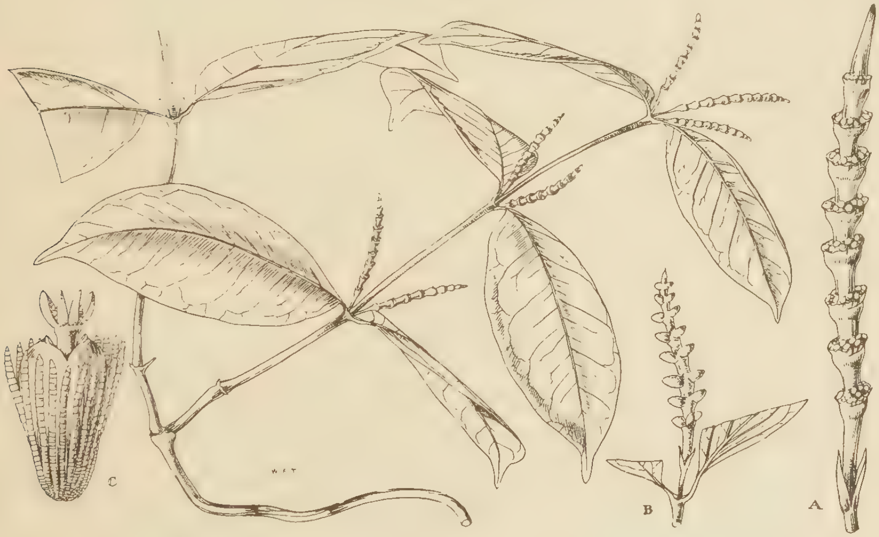

FIG. 9.—GNETUM BUCHHOLZIANUM *Engl.* (GNETACEAE).
A, male spike. B, female spike. C, female flower.

GNETUM Linn.—F.T.A. 6, 2 : 330.

Internode of male spike of the same diameter throughout its length, slender in dried (or old) specimens ; staminal column exserted from the mouth of the envelope ; leaves ovate-oblong or elliptic-oblong, more rarely lanceolate, attenuate at base, abruptly acuminate, 10–13 cm. long, 3·5–5 cm. broad .. .. 1. *africanum*

Internode of male spike in the fresh condition much thicker at the base than higher up ; staminal column hardly exserted from the mouth of the envelope ; leaves ovate-elliptic or broadly elliptic, rounded or very slightly cuneate at base, abruptly acuminate, 9–14 cm. long, 4–7 cm. broad .. .. 2. *buchholzianum*

1. **G. africanum** *Welw.*—F.T.A. 6, 2 : 330 ; Markgraf in E. & P. Pflanzenfam. 13 : 440 (1926). A dioecious liane ; in forest.
Br.Cam.: Abonando, Mamfe (Apr.) *Rudatis* 42 ! Also in French Cameroons, Gabon, Belgian Congo and Angola.

2. **G. buchholzianum** *Engl.*—F.T.A. 6, 2 : 331 ; Markgraf l.c. A dioecious liane ; in forest.
Br.Cam.: Victoria (Oct., Nov.) *Maitland* 749 ! 780 ! Johann-Albrectshöhe *Staudt* 543 ! Also in French Cameroons.

ANGIOSPERMAE

DICOTYLEDONES

ARCHICHLAMYDEAE

4. ANNONACEAE

Trees, shrubs or climbers, aromatic. Leaves alternate, entire, exstipulate. Flowers terminal, leaf-opposed or axillary, solitary or crowded, hermaphrodite or rarely unisexual, mostly trimerous. Sepals 3, rarely 2, separate or united into a 3-lobed calyx, valvate or rarely imbricate, persistent or deciduous. Petals generally 6, in two series, valvate or slightly imbricate, rarely in two series of 2, or the inner series absent. Stamens generally numerous, hypogynous ; anther-cells adnate, with the connective often truncate. Carpels numerous or rarely few or solitary, free or very rarely united into a 1-celled ovary with parietal placentas ; ovules 1 or more. Fruiting carpels sessile or stipitate, mostly indehiscent. Seed with or without an aril, with copious ruminate endosperm and minute embryo.

Mainly in tropical and subtropical regions. Recognized by the alternate, exstipulate leaves, mostly trimerous flowers, numerous and often truncate free stamens, free carpels, and seeds with ruminate endosperm.

*Carpels spirally arranged, free, or if united forming a many-celled syncarp ; stigmas erect ; petals free, or rarely slightly united at base :
†Fruit apocarpous, of sessile or stipitate carpels always free at maturity (fruiting carpels contiguous and at the base included in the receptacle in *Pachypodanthium*) :
Petals always in two series, both or only the inner series imbricate :
Fruiting carpels stipitate or sessile, not included in the receptacle at base :
Inner and outer petals subequal, the inner ones at length spreading ; ovules 6 or more ; indumentum usually of stellate, or more rarely simple, hairs ; shrubs or lianes .. .. 1. **Uvaria**
Inner petals much shorter than the outer and closely appressed over the stamens and carpels ; ovules 1–2 ; leaves glabrous ; trees .. .. 2. **Cleistopholis**
Fruiting carpels contiguous and included in the receptacle at base ; ovules numerous ; indumentum stellate .. .. 3. **Pachypodanthium**
Petals all valvate, in two distinct series or in one series :
Petals in two series, each of 3 petals :
Outer 3 petals much smaller than the inner ones and scarcely distinguishable from the sepals ; inner petals elongated :
Flowers in cymes or panicles ; inner petals ovate-lanceolate .. 4. **Piptostigma**
Flowers in fascicles ; inner petals linear.. .. .. .. 5. **Brieya**
Outer 3 petals as large as, or larger than, the inner petals (but see *Xylopia rubescens*), distinct from the sepals :
Inflorescence borne on a recurved hook-like thickened peduncle, leaf-opposed 6. **Artabotrys**
Inflorescence not on hook-like peduncles :
Petals broadened and hollowed at base, usually with a more or less lanceolate blade (but see *Xylopia africana* and *X. staudtii*) ; anthers transversely septate ; pollen grains large :
Carpels with 2–12 ovules ; fruiting carpels several-seeded, sessile or on a stout stipe ; inner petals usually only a little shorter than the outer, rarely much shorter (in *X. rubescens*) .. .. 7. **Xylopia**
Carpels with 1 ovule ; fruiting carpels 1-seeded, on slender stipe ; inner petals much shorter than the outer .. .. .. 8. **Neostenanthera**
Petals not broadened and hollowed at base ; anthers not transversely septate :
Sepals relatively small and not covering the petals in bud (but see *Uvariodendron fuscum*) :
Flower buds oblong ; petals subequal, linear to lanceolate ; carpels with 1–3 ovules ; fruiting carpels subglobose, stipitate .. 9. **Polyalthia**
Flower buds subglobose or ovoid-conical :
Fruiting carpels stipitate, 1-seeded, or if several-seeded then narrowly constricted between the seeds :
Inner and outer petals subequal, or somewhat dissimilar in size, but similar in shape and texture .. .. 10. **Popowia**

Inner and outer petals very unequal and dissimilar in shape and texture **11. Oxymitra**

Fruiting carpels sessile or subsessile, several-seeded but not narrowly constricted between the seeds :

Inner petals contiguous from base to apex in bud **12. Polyceratocarpus**

Inner petals contiguous only at the top, narrowed at base leaving a gap between adjacent petals .. .. **13. Uvariodendron**

Sepals relatively large and entirely covering the petals in bud ; often with the angles of the bud winged (but not in *U. elliotianum*) **14. Uvariastrum**

Petals in a single series, 3–6 :

Petals 6 :

Sepals completely covering the petals in bud ; petals united into a short tube at base, transversely plicate in bud .. .. **15. Hexalobus**

Sepals not covering the petals in bud :

Petals equal, not covering each other in bud, free at base ; stamens very numerous on an ellipsoid receptacle .. .. **16. Monocyclanthus**

Petals with the 3 larger covering the 3 smaller ones in the upper part in bud, free or united at base ; stamens 9–12 in a single whorl ; leaves often glaucous beneath .. .. **17. Enneastemon**

Petals 3 or 4 :

Petals 4, sepals 2, flowers unisexual .. .. **18. Uvariopsis**

Petals 3, sepals 3, flowers hermaphrodite :

Ovules about 10 in each carpel ; petals alternate with the sepals **19. Dennettia**

Ovule solitary ; petals opposite the sepals .. .. .. **20. Enantia**

†Fruit syncarpous ; carpels united into a fleshy mass in fruit :

Inner petals imbricate ; flowers numerous in branched cymes on leafless branches below the foliage .. .. **21. Anonidium**

Inner and outer petals valvate ; flowers solitary, or 2–7 in fascicles, on usually leafy twigs .. .. **22. Annona**

*Carpels in a single whorl, united into a 1-celled ovary with parietal placentas ; stigmas radiating ; petals more or less united into a tube :

Petals in a single series, corolla tube funnel-shaped, lobes all alike **23. Isolona**

Petals in 2 series ; the external petals shortly united at base, with larger lobes, often with wavy margins ; internal petals smaller and entire or with lateral lobes **24. Monodora**

In addition to the above, *Cananga odorata* (Lam.) Hook. f. & Thoms. from tropical Asia is often cultivated in our area.

1. UVARIA Linn.—Engl. & Diels Monogr. Afr. Annonac. 7 (1901).

*Calyx cupular in bud, splitting more or less irregularly into 3 lobes as the flowers open, or remaining scarcely lobed :

†Petals not exceeding 2 cm. long :

Fruiting carpels globose or subglobose, up to 1·2 cm. diam. :

Fruiting carpels smooth, sessile or shortly stipitate ; stipe shorter than the carpel ; leaves with up to 8 pairs of rather obscure lateral nerves :

Leaves oblong-lanceolate, rounded to cordate at base, 4–8 cm. long, 1·5–2·5 cm. broad, midrib beneath densely clothed with long simple or fascicled hairs even at maturity ; sepals about 5 mm. long, petals 6–8 mm. long in open flower 1. *ovata* subsp. *ovata*

Leaves ovate-elliptic, obtuse to cuneate at base, 4–8 cm. long, 1·5–3·5 cm. broad, midrib beneath very sparsely pubescent at maturity, with short hairs ; flowers and fruits as above .. .. 1a. *ovata* subsp. *afzeliana*

Fruiting carpels verrucose, long-stipitate ; stipe 2–3 cm. long ; leaves oblong-lanceolate, 7–10 cm. long, 2·3–3·5 cm. broad, rounded at base, densely tomentellous with long and short stellate hairs beneath ; 15–20 pairs of lateral nerves, impressed above and very prominent beneath ; calyx about 1 cm. in diam. when expanded, scarcely lobed ; petals suborbicular, concave, about 1 cm. in diam. 2. *baumannii*

Fruiting carpels cylindrical or ellipsoid, exceeding 1·2 cm. in length :

Mature leaves very sparsely pubescent with short stellate hairs :

Leaves oblong-elliptic to ovate-elliptic, obtuse to cuneate at base, shortly acuminate, 4·5–15 cm. long, 2·5–6·5 cm. broad, with 6–10 pairs of rather obscure lateral nerves, not impressed above ; calyx about 5 mm. long ; petals oblong, up to 14 mm. long and 8 mm. broad ; fruiting carpels cylindrical, up to 3 cm. long, subsessile or with stipe up to 1 cm. long .. .. 3. *chamae*

Leaves oblong-ovate or broadly elliptic, rounded or subcordate at base, acutely acuminate, 10–25 cm. long, 5–13 cm. broad, with 10–15 pairs of lateral nerves impressed above and prominent beneath ; calyx about 8 mm. long ; petals broadly ovate about 16 mm. long and 15 mm. broad ; fruiting carpels ellipsoid 2–3 cm. long, with stipe about 1·5 cm. long .. .. .. 4. *anonoides*

Mature leaves pubescent with long spreading simple and fasciculate hairs, sometimes with shorter stellate hairs as well :

Fruiting carpels smooth, cylindrical, up to 5 cm. long, stipe 10–15 mm. long ; leaves oblong to oblong-obovate, rounded to subcordate at base, acute at apex, 7–17 cm. long, 3–9 cm. broad .. .. .. 5. *angolensis* subsp. *guineensis*

Fruiting carpels densely warty, ellipsoid, 2 2·5 cm. long, stipe 7–12 mm. long ; leaves narrowly oblong-obovate, rounded at base, shortly acuminate, 7–12 cm. long, 2·5–6 cm. broad .. .. 6. *doeringii*

†Petals up to 4 cm. long, 1·3 cm. broad, oblong-lanceolate, rather densely stellate-pubescent outside ; leaves oblong, rounded or obtuse at apex, 6–9 cm. long, 4–5 cm. broad ; rather densely stellate pubescent beneath ; flowers few in a cluster ; pedicels 7–8 mm. long, fruiting carpels densely warty, up to 4·5 cm. long and 2 cm. broad .. .. 7. *sofa*

*Calyx with the lobes distinct in bud, separating as the flowers open into regular sepals, free to the middle or to the base :

Leaves quite glabrous, subcoriaceous, oblong, rounded to subcordate at base, acute at apex, 15–20 cm. long, 5·5–7 cm. broad, with a cartilaginous margin ; sepals thick, broadly ovate, 9–10 mm. long ; petals semiorbicular, 2–3 cm. long and almost as broad .. .. 8. *obanensis*

Leaves pubescent, without a cartilaginous margin :

Leaves obovate, narrowed to a subacute base, acutely acuminate, 6–15 cm. long, 2–5·5 cm. broad, softly stellate-pubescent beneath ; lateral nerves 8-10 pairs ; pedicels 1·5 cm. long, tomentellous ; petals subequal, about 1 cm. long, tomentellous .. .. 9. *dinklagei*

Leaves rounded or cordate at base :

Leaves rounded and emarginate at apex, subcordate at base, shortly petiolate, elliptic, 4–6·5 cm. long, 2·5–4 cm. broad, finely pubescent beneath ; lateral nerves about 5 pairs ; sepals broadly triangular, about 4 mm. long, outer petals about 12 mm. long ; young fruiting carpels stipitate, glabrous .. 10. *farquharii*

Leaves acute or acuminate :

Sepals not exceeding 1 cm. long :

Petals flat or nearly so, oblong or obovate, spreading, densely tomentose within, oblong, 1–1·4 cm. long ; sepals broadly ovate, about 5 mm. long ; flowers solitary, supra-axillary ; leaves oblong-oblanceolate, 10–13 cm. long, 3–4·5 cm. broad, rounded at base, long-acuminate, like the stems long bristly pilose beneath ; fruit unknown .. .. 11. *thomasii*

Petals concave, connivent, broadly triangular-semiorbicular, thick, about 1·5 cm. diam. or more ; sepals broadly ovate-triangular, 8–10 mm. long ; leaves oblong-obovate, 15–35 cm. long, 5–15 cm. broad, rounded at base, acuminate, with 10–15 pairs of nerves prominent beneath, pubescent with rather long fascicled hairs beneath ; fruit unknown .. .. .. 12. *bipindensis*

Sepals exceeding 1 cm. in length, ovate, acute or subacute ; petals more or less ovate and flat, 1·8–3 cm. long :

Fruiting carpels long-stipitate ; stipe attached to one side of carpel which is lobed on the other side ; carpels densely covered with long hairs ; leaves and branchlets with long hairs, upper surface of leaves not scabrid ; leaves oblong, rounded at base, subacute or obtuse at apex, 7–25 cm. long, 3–7 cm. broad 13. *afzelii*

Fruiting carpels sessile ; leaves and branchlets with short, mainly stellate hairs, upper surface of leaves scabrid with short simple hairs ; leaves oblong, rounded at base, obtuse at apex, 10–18 cm. long, 3·5–6·5 cm. broad.. 14. *scabrida*

1. **U. ovata** (*Dunal*) *A.DC.* subsp. **ovata**—F.T.A. 1 : 21 ; Engl. & Diels Monogr. Afr. Annonac. 29 (1901); Keay in Kew Bull. 1952 : 543 (1953). *Unona ovata* Dunal (1817). *Uvaria cordata* Schum. & Thonn. (1827) ; F.T.A. 1 : 22 ; Engl. & Diels l.c. 29 ; F.W.T.A., ed. 1, 1 : 50 (excl. descr. and spec. *Farquhar*). *Uvaria globosa* Hook. f. (1849) ; F.T.A. 1 : 22 ; Engl. & Diels l.c. 14 (excl. syn. *U. leonensis* Engl. & Diels) ; F.W.T.A., ed. 1, 1 : 50. *Uvaria globosa* var. *warneckei* Engl. in Engl. & Diels l.c. ; F.W.T.A., ed. 1, 1 : 50. Shrub, forming dense thickets, 3–8 ft. high ; petals brown, fruits orange.
Iv.C.: Baoulé (Oct.) *Pobéguin* 203 ! **G.C.:** *Thonning* ! Accra (fl. & fr. July) *T. Vogel* ! *Dalz*. 109 ! Achimota (fl. & fr. Jan.-June) *Foggie* FH 5133 ! *Milne-Redhead* 5050 ! 5050*b* ! Cape Coast *Brass* ! Aburi Hills (Apr.) *Bally* 67*a* ! **Togo:** Lome (fl. & fr. May) *Warnecke* 147 !

1a. **U. ovata** subsp. **afzeliana** (*DC.*) *Keay* in Kew Bull. 1952 : 544 (1953). *Unona ovata* var. *afzeliana* DC. Syst. Veg. 1 : 489 (1818). *Uvaria leonensis* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2 : 293 (1899). *Uvaria globosa* of Engl. & Diels Monogr. 14, partly. *Uvaria ovata* of F.W.T.A., ed. 1, 1 : 50, not of (Dunal) A.DC. *Uvaria microphylla* A. Chev. Bot. 7, name only. Shrub of rocky places in hill forest.
S.L.: *Afzelius* ! Near top of Sugar Loaf (Apr.) *Sc. Elliot* 5774 ! Rowala (fr. July) *Thomas* 1056 ! **Lib.:** Soplima, Kolahun (fr. Nov.) *Baldwin* 10053 ! **Iv.C.:** Mt. Goula, Danané (Apr.) *Chev.* 21210 !

2. **U. baumannii** *Engl. & Diels* in Notizbl. Bot. Gart. Berl. 2 : 294 (1899) ; Monogr. 21. *U. verrucosa* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2 : 294 (1899), not of Scheff. (1885). *U. engleriana* Exell in J. Bot. 73, Suppl. Polypet. 4 (1935) ; Boutique in Fl. Congo Belge 2 : 286 (1951). Liane, with numerous long-stipitate carpels.
S.L.: Biu Kolo (fr. Aug.) *Thomas* 1815 ! **Lib.:** Barcleyville (Mar.) *Baldwin* 11103 ! **Togo:** Misahöhe (fr. Apr.) *Baumann* 527 ! Also in French Cameroons, Gabon and Belgian Congo.

3. **U. chamae** *P. Beauv.*—F.T.A. 1 : 22 ; Engl. & Diels Monogr. 15 ; Aubrév. Fl. Soud.-Guin. 37. *Unona macrocarpa* Dunal (1817). *Uvaria cylindrica* Schum. & Thonn. (1827). *Uvaria cristata* R. Br. ex Oliv.—F.T.A. 1 : 23 ; F.W.T.A., ed. 1, 1 : 50. *Uvaria nigrescens* Engl. & Diels—F.W.T.A., ed. 1, 1 : 50.

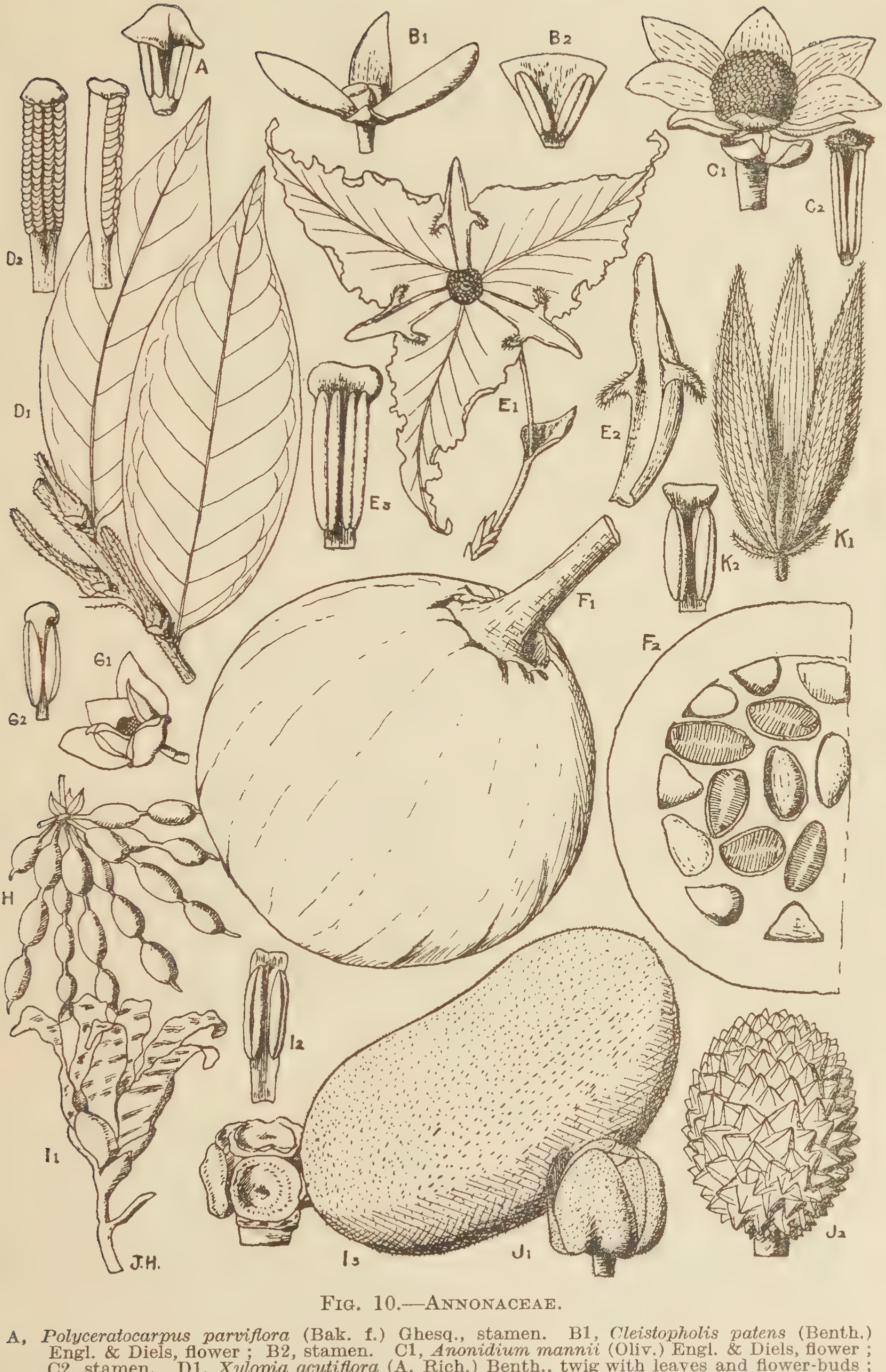

Fig. 10.—Annonaceae.

A, *Polyceratocarpus parviflora* (Bak. f.) Ghesq., stamen. B1, *Cleistopholis patens* (Benth.) Engl. & Diels, flower ; B2, stamen. C1, *Anonidium mannii* (Oliv.) Engl. & Diels, flower ; C2, stamen. D1, *Xylopia acutiflora* (A. Rich.) Benth., twig with leaves and flower-buds ; D2, stamen with septate anther, from front and side. E1, *Monodora tenuifolia* Benth., flower ; E2, inner petal ; E3, stamen. F1, *Monodora myristica* (Gaertn.) Dunal, fruit ; F2, cross-section of same. G1, *Uvaria dinklagei* Engl. & Diels, flower ; G2, anther. H. *Oxymitra gracilis* (Hook. f.) Sprague & Hutch., fruit. I1, *Hexalobus crispiflorus* A. Rich., flower ; I2, stamen ; I3, fruiting torus with one carpel attached. J1, *Pachypodanthium staudtii* Engl. & Diels, flower bud ; J2, fruit. K1, *Piptostigma pilosum* Oliv., flower ; K2 stamen. Partly after Engler.

Uvaria echinata A. Chev. Bot. 6, name only. Scandent shrub or small tree to 10 ft. high ; petals dirty ochraceous ; fruits rusty-brown.
Sen.: *Leprieur* ! **Fr.Sud.:** Kita (fr. Oct.) *Dubois* 25 ! **Fr.G.:** Karkandy *Heudelot* 873 ! Conakry (June) *Debeaux* 428 ! Farana (Mar.) *Sc. Elliot* 5316 ! **S.L.:** *Afzelius* ! *Purdie* ! Njala (fr. July) *Deighton* 1960 ! Waterloo (June) *Deighton* 2741 ! **Lib.:** Gola (Mar.) *Bunting* ! **Iv.C.:** Ferki (Apr.) *Aubrév.* 2274 ! **G.C.:** *Thonning* ! Alabadi (Apr.) *Scholes* 291 ! Dodowa, E.P. (Dec.) *Vigne* 4280 ! **Togo:** Lome (May) *Warnecke* 148 ! **Dah.:** *Newton* 5. **N.Nig.:** Nupe *Barter* 1336 ! Bauchi Plateau (Apr.) *Lely* P. 229 ! **S.Nig.:** Lagos (Aug.-Nov.) *Rowland* ! *Millen* ! *Dalz.* 1098 ! Ibadan (Apr.) *Meikle* 1441 ! 1449 ! Awka (May) *Jones* FHI 6527 ! Degema *Talbot* 3759 ! Extends to Belgian Congo. (See Appendix, p. 7.)

4. **U. anonoides** *Bak. f.* in Cat. Talb. 2 (1913). *Annona latifolia* Sc. Elliot in J. Linn. Soc. 30 : 69 (1895). *Uvaria latifolia* (Sc. Elliot) Engl. & Diels Monogr. 22 (1901), not of (Dunal) Blume (1828) ; F.W.T.A., ed. 1, 1 : 50. *U. platyphylla* Boutique in Fl. Congo Belge 2 : 296 (1951). *Chrysophyllum akuasi* A. Chev. Bot. 385, name only. Forest liane or small tree of straggling habit.
S.L.: Falaba (Mar.) *Sc. Elliot* 5421 ! Kafogo, Limba (Apr.) *Sc. Elliot* 5617 ! Dodo (Apr.) *Deighton* 3915 ! Njala (fr. Feb.) *Deighton* 3117 ! **Iv.C.:** Attié *Chev.* 22663 ! **G.C.:** Kumasi (Apr.) *Vigne* 1099 ! Mampong (Apr.) *Vigne* 1926 ! **S.Nig.:** Osun F. R. (May) *Ejiofor* FHI 26126 ! Akure F.R. (fr. Oct.) *Keay* ! Shasha F.R. (Feb.–Apr.) *Richards* 3093 ! *Ross* 196 ! Oban *Talbot* 1558 ! Also in French Cameroons and Belgian Congo.

5. **U. angolensis** *Welw. ex Oliv.* subsp. **guineensis** *Keay* in Kew Bull. 1953 : 71. *U. cordata* of F.W.T.A., ed. 1, 1 : 50, partly, not of Schum. & Thonn. Straggling tree or shrub, with light golden-brown indumentum ; petals brownish-yellow, waxy ; at edge of forest and in fringing forest.
S.L.: *Crichton* 159 ! **Togo :** Togo Plateau F.R. (June) *Adogla* FH 4080 ! **S.Nig.:** Ukehe, Benin (Sept.) *Farquhar* 73*a* ! Enugu (May) *Jones* FHI 18864 ! **Br.Cam.:** Lakka, Bamenda (June) *Maitland* 1568 ! Also in French Cameroons ; the typical species is in Belgian Congo, Uganda, Kenya, N. Rhodesia and Angola (see Boutique in Fl. Congo Belge 2 : 295 (1951)).

6. **U. doeringii** *Diels* in Engl. Bot. Jahrb. 53 : 435 (1915). Tree or scrambling shrub, to 20 ft. high ; flowers brown.
G.C.: Achimota-Aburi Road (fl. & fr. Apr., May) *Irvine* 698 ! *Boughey* 129 ! Abokobi (fl. & fr. Jan.) *Irvine* 1987 ! 2593 ! Abuantem (May) *Andoh* FH 5021 ! Agena (fr. June) *Boughey* 130 ! **Togo:** Atakpame (fr. May) *Doering* 259 ! Dah. : *Poisson* !

7. **U. sofa** *Sc. Elliot* in J. Linn. Soc. 30 : 69 (1895) ; Engl. & Diels Monogr. 27 ; Chev. Bot. 7. A tree or scandent shrub, up to 20 ft. high.
Fr.G.: *Farmar* 337 ! Farana (Mar.) *Sc. Elliot* 5376 ! Macenta (Oct.) *Baldwin* 9815 ! Timbo (Mar.) *Pobéguin* 903 ! Labé (Mar.) *Chev.* 12400 ! Dalaba (fr. Apr.-Oct.) *Chev.* 18227 ! 18863 ! (See Appendix, p. 7.)

8. **U. obanensis** *Bak. f.* in Cat. Talb. 1 (1913). *U. marginata* Diels in Engl. Bot. Jahrb. 53 : 437 (1915). Scandent shrub, inner petals dull orange, outer apricot lined deep red.
S.Nig.: Oban *Talbot* 402 ! 432 ! 1579 ! 1603 ! **Br.Cam.:** Johann-Albrechtshöhe (Dec.) *Busgen* 191. Also in French Cameroons.

9. **U. dinklagei** *Engl. & Diels* Monogr. 21 (1901). A climbing shrub with yellowish-green flowers.
Lib.: Grand, Bassa in low bush near the seashore (fl. May, Aug., fr. Sept.) *Dinklage* 1794 ! 1822 ! 2061 !

10. **U. farquharii** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 50 (1927) ; Kew Bull. 1927 : 151. Woody climber.
S.Nig.: Ukehe, Benin, (Sept.) *Farquhar* 73 (partly) !

11. **U. thomasii** *Sprague & Hutch.* in Kew Bull. 1916 : 158. A twining shrub with spreadingly hispid branches.
S.L.: Sendugu (June) *Thomas* 569 !

12. **U. bipindensis** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 292 (1899) ; Engl. & Diels Monogr. 12. Extensive liane, in forest ; flowers on old wood, petals whitish, sepals pale green.
Br.Cam.: S. Bakundu F.R. (Mar.) *Brenan* 9445 ! Also in French Cameroons.

13. **U. afzelii** *Sc. Elliot* in J. Linn. Soc. 30 : 70 (1895) ; Engl. & Diels Monogr. 22 ; Chev. Bot. 5. Small tree to 15 ft. high, or spreading shrub ; flowers greenish-yellow or cream.
Fr.G.: Kindia *Jac.-Fel.* ! **S.L.:** *Afzelius* ! Between Kahreni and Port Loko (Apr.) *Sc. Elliot* 5812 ! Mofari *Sc. Elliot* 4412 ! Njala (May-June) *Deighton* 2581 ! 2643 ! **Lib.:** Sinoe Basin *Whyte* ! Gbanga (fr. Sept.) *Linder* 691 ! **Iv.C.:** Dabou *Chev.* 15564 ! 17218 ! Bingerville *Jolly* ! Baoulé *Pobéguin* 272 ! **G.C.:** Axim (Apr.) *Chipp* 708 ! Kumasi (July) *Vigne* 3955 ! Atwabo (fr. Feb.) *Irvine* 2292 ! **S.Nig.:** Olokemeji (fr. June) *Foster* 308 ! Mamu River F.R., Onitsha (young fr. July) *Latilo* FHI 27628 ! (See Appendix, p. 7.)

14. **U. scabrida** *Oliv.* F.T.A. 1 : 21 (1868) ; Engl. & Diels Monogr. 14. Climbing shrub, or small tree, to 30 ft. high ; petals yellowish-green.
Lib.: Grand Bassa (May) *Dinklage* 1936. **S.Nig.:** Calabar *Thomson* 98 ! Eket *Talbot* 3250 ! Degema *Talbot* 3668 ! **Br.Cam.:** Cameroons R. *Mann* 1433 ! Extends to Belgian Congo and Angola.

Imperfectly known species.

U. tortilis *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 50 (1927) ; Chev. Bot. 8, name only. Flowers unknown ; genus uncertain.
Iv.C.: Bingerville *Chev.* 15563 !

2. CLEISTOPHOLIS Pierre—Engl. & Diels Monogr. Afr. Annonac. 33 (1901).

Leaves ovate-elliptic to lanceolate, coriaceous, shining above, midrib noticeably depressed, 12–25 cm. long, 3–5 cm. broad, glabrous, petioles up to 1 cm. long ; pedicels 2–2·5 cm. long ; sepals small ; outer petals obovate to oblong, 7–10 mm. long, 3–4 mm. broad, inner petals about 2 mm. long and broad ; fruiting carpels on thickened stipe, tuberculate, 2·5 cm. long, 1·5 cm. diam.. . . . . . . 1. *patens*

Leaves obovate-elliptic to elliptic-lanceolate, coriaceous, 10–15 cm. long, 5–6 cm. broad, glabrous, petioles more than 1 cm. long ; pedicels 1 cm. long ; sepals triangular, small ; outer petals almost linear, 8–10 mm. long, 2 mm. broad ; fruits similar to above . . . . 2. *staudtii*

1. **C. patens** (*Benth.*) *Engl. & Diels* Monogr. Afr. Annonac. 35, t. 12 (1901). *Oxymitra patens* Benth.—F.T.A. 1 : 34. *C. klaineana*, of F.W.T.A. ed. 1, 1 : 51. A tree up to 90 ft. high with horizontal branches ; flowers greenish-yellow ; young leaves often very long ; bark pale grey, slash moist and fragrant ; wood light, floats easily.
S.L.: Bagroo R. (Apr.) *Mann* 828 ! Falaba (Feb.) *Aylmer* 4 ! **Lib.:** Dukwia R. (fr. May) *Cooper* 430 ! **Iv.C.:** Faranou (fr. Aug.) *Chev.* 22379 ! **G.C.:** Kwahu Prasu (Feb.) *Vigne* 1616 ! **N.Nig.:** Lokoja (Mar.) *Shaw* 16 ! **S.Nig.:** Eppah *Barter* 3267 ! Old Calabar *Thomson* 5 ! **Br.Cam.:** Bibundi (Nov.) *Mildbr.* 10640 ! Also in French Cameroons and Gabon. (See Appendix, p. 3.)

2. **C. staudtii** *Engl. & Diels* l.c. 35 (1901). Medium-sized tree (*fide* Ross & Mildbraed) with horizontal branches and more or less distichously arranged shining leaves ; ripe fruits purple.
S.Nig.: Shasha F. R. (fr. Apr.) *Ross* 247 ! **Br.Cam.:** Johann-Albrechtshöhe (Apr.) *Staudt* 957 ! Also in French Cameroons and Uganda. (See Appendix, p. 3.)

3. PACHYPODANTHIUM Engl. & Diels in Notizbl. Bot. Gart. Berl. 3 : 55 (1900).

Leaves elongate-oblong, shortly tapered at each end, 15–25 cm. long, 4-5 cm. broad, sparingly clothed with minute stellate hairs beneath ; branchlets closely tomentellous; sepals densely tomentellous outside, glabrous inside ; petals glabrous ; fruiting carpels loosely united, ribbed .. .. 1. *staudtii*

Leaves broadly elliptic-lanceolate, narrowed from near the middle to each end, 17-22 cm. long, 5–6·5 cm. broad, sparingly clothed with minute stellate hairs beneath ; branchlets at first minutely puberulous, at length glabrous ; flowers not seen ; fruiting carpels compact .. .. 2. *barteri*

1. **P. staudtii** *Engl. & Diels* Monogr. Afr. Annonac. 32, t. 11 (1901) ; Chev. Bot. 8. A large-boled forest tree, 60–90 ft. high, with grey, rough, odoriferous bark ; timber hard ; flowers pale yellow ; mature fruit fleshy, reddish.
S.L.: Kambui *Lane-Poole* 197 ! *Sawyerr* FHN 13554 ! **Lib.:** Dukwia R. (Feb.) *Cooper* 296 ! **Iv.C.:** Anyama (fr. Feb.) *Chev.* 16224 ! Abidjan (Nov.) *Aubrév.* 164 ! **G.C.:** Mampong Scarp (May) *Vigne* 1721 ! **S.Nig.:** Oban *Talbot* 1494 ! Also in French Cameroons. (See Appendix, p. 6.)

2. **P. barteri** (*Benth.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 51 (1927) ; Kew Bull. 1927 : 151. *Annona barteri* Benth.—F.T.A. 1 : 17. Tree, 50 ft., leaves shining ; fruit the size of a peach.
S.Nig.: Onitsha *Barter* 445 ! Koton Karifi Swamp F. R. *Johnstone* K. 14 ! Ibaji-Ojoku F.R., Kabba Prov. (fr. Mar.) *Taylor* 13 !

4. PIPTOSTIGMA Oliv.—F.T.A. 1 : 18.

Inflorescence elongated, 15–35 cm. long ; leaves abruptly acuminate, more or less obovate or broadly elliptic :

Sepals linear-lanceolate, acuminate ; leaves rounded at base, 20–30 cm. long, up to 15 cm. broad, with about 20 pairs of lateral nerves, weakly pilose beneath ; inner petals longitudinally nerved, about 5·5 cm. long .. .. 1. *pilosum*

Sepals ovate-triangular, short, scarcely acuminate :

Leaves oblong or obovate-elliptic, distinctly narrowed to the base, up to about 20 cm. long and 9 cm. broad, with 20–30 pairs of lateral nerves ; inner petals linear-lanceolate, about 4·5 cm. long, rather obscurely nerved .. 2. *preussii*

Leaves broadly elliptic, rounded to the base, very large, up to 30-35 cm. long and 25 cm. broad, with about 30 pairs of lateral nerves ; inner petals broadly lanceolate, about 5 cm. long, strongly nerved outside, softly tomentose ; fruiting carpels stellate, sessile, bluntly beaked, ribbed, about 2·5 cm. long .. 3. *giganteum*

Inflorescence few-flowered, on the branches ; leaves narrowly oblong-obovate, narrowed to a rounded base, gradually acuminate, or rounded at apex, 6–24 cm. long, 2–8 cm. broad, with 18–22 pairs of lateral nerves ; sepals lanceolate, acute, 6–7 mm. long ; outer petals lanceolate 9–10 mm. long ; inner petals 3–3·5 cm. long, long pilose ; fruiting carpels 2–4, sessile, ovoid, bluntly beaked, warted, about 18 mm. long 4. *fugax*

1. **P. pilosum** *Oliv.*—F.T.A. 1 : 18.
S. Nig.: Calabar *Thomson* 61 ! Oban *Talbot* 1290 ! 1420 ! Eket *Talbot* 3143 !

2. **P. preussii** *Engl. & Diels* Monogr. Afr. Annonac. 54 (1901). A tree, 30 ft.
Br.Cam.: Barombi *Preuss* 251 ! Also in French Cameroons.

3. **P. giganteum** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 52 (1927) ; Kew Bull. 1927 : 151. A tree.
S.Nig.: Oban *Talbot* 1336 !

4. **P. fugax** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 52 (1927) ; Chev. Bot. 13, name only. A shrub, up to 12 ft. ; flowers red.
Lib.: Peahtah (fr. Oct.) *Linder* 962 ! **Iv.C.:** Mid. Sassandra to Mid. Cavally (June) *Chev.* 19193 ! Grabo (July) *Chev.* 19620 !

5. BRIEYA De Wild. in Fedde Rep. 13 : 383 (1914).

A small tree ; young branches shortly tomentose, at length glabrous ; leaves oblong-obovate, 15–30 cm. long, 4–10 cm. broad, apex rounded to broadly acuminate, rounded and unequal at base, glabrous when mature ; 15–20 pairs of ascending lateral nerves prominent beneath ; flowers fasciculate on woody twigs ; pedicels 1–1·5 cm. long ; sepals broadly triangular, 2–3 mm. long ; outer 3 petals short and similar to the sepals ; inner 3 petals 6–8 cm. long, 5–9 mm. broad ; sepals and petals finely pubescent ; stamens 1·5–2 mm. long ; carpels 2–5, pubescent, stigmas densely hairy ; fruit of 2–4 ovoid carpels about 10 cm. long and 6 cm. broad .. *fasciculata*

B. fasciculata *De Wild.* in Fedde Rep. 13 : 383 (1914). *Piptostigma aubrevillei* Ghesq. ex Aubrév. Fl. For. C. Iv. 1 : 98 (1936), French deser. only. An understorey tree of forest.
Iv.C.: Agnéby (fl. & fr. Aug.) *Aubrév.* 2115 ! Agboville (Aug.) *Aubrév.* 1500 ! **G.C.:** Tafo (May) *Darko* 194 ! S. Fomang Su F. R. (June) *Vigne* 2057 ! Also in Congo and Angola.

6. ARTABOTRYS R. Br.—F.T.A. 1 : 27.

*Outer petals in mature flowers exceeding 15 mm. long and 3 mm. broad :

†Inflorescence many-flowered, dense :

Outer petals about 25 mm. long, constricted above the thickened base, with a blade about 8 mm. broad ; leaves oblong-elliptic 15–21 cm. long, 7–9 cm. broad, rounded or cuneate at base, abruptly acuminate, closely and prominently reticulate, glabrous .. .. 1. *jollyanus*

Outer petals 15–17 mm. long, 3 mm. broad, lanceolate, slightly constricted above the base ; leaves oblong-elliptic, 10–15 cm. long, about 6 cm. broad, rounded at base, shortly acuminate, with 9–12 pairs of lateral nerves prominent beneath, pilose on nerves beneath, then glabrescent .. .. 2. *thomsonii*

†Inflorescence 1–3-flowered :

Petals with a broad thickened basal portion surrounding the stamens, and a blade contracted where it joins the basal part :

Outer petals at least 30 mm. long and 8 mm. broad, tomentellous outside, densely so at base ; leaves oblong, 7–20 cm. long, 3–10 cm. broad, shortly cuneate, gradually acuminate ; fruiting carpels obovoid, long-stipitate 3. *insignis*

Outer petals 18–20 mm. long, shortly pubescent ; leaves oblong-elliptic, 5–13 cm. long, 2·5–4·5 cm. broad, cuneate at base, abruptly acuminate ; fruiting carpels ovoid, beaked, sessile .. .. 4. *coccineus*

Petals broadly lanceolate, not contracted above a thickened base ; outer petals lanceolate, about 20 mm. long and 8 mm. broad, very shortly pubescent ; leaves lanceolate, about 15 cm. long and 5 cm. broad, cuneate at base, acuminate, glabrous 5. *oliganthus*

*Outer petals in mature flowers up to 15 mm. long and not exceeding 3 mm. broad in the blade :

Leaves large, 15–25 cm. long, 10–15 cm. broad, broadly elliptic or ovate-rotundate, rounded at base, rather abruptly and acutely acuminate, with 6–8 pairs of arcuate nerves prominent beneath, glabrous ; inflorescences densely many-flowered ; petals about 15 mm. long with broad base and short narrow blade, about twice as long as the sepals .. .. 6. *macrophyllus*

Leaves up to 15 cm. long and 6 cm. broad :

Outer petals linear or lanceolate, not subulate :

Outer petals 8–9 mm. long, densely ferruginous-pilose, gradually broadened to a 3–4 mm. broad base ; inner petals rather thick and subterete, leaves oblong-elliptic to lanceolate, 7–12 cm. long, 3–4 cm. broad, cuneate at base, shortly acuminate, midrib and nerves appressed pilose beneath ; branchlets pilose when young, becoming only sparsely so .. .. 7. *velutinus*

Outer petals 9–15 mm. long, with narrow blade broadened to a 1·5–2 mm. broad base ; inner petals flat in section :

Mature branchlets and underside of leaves glabrous or very sparsely pubescent ; leaves oblong-lanceolate, acute at base, long-acuminate, 6–10 cm. long, 2–3 cm. broad ; inflorescence slender, many-flowered ; outer petals about 13 mm. long (flowers very similar to *dahomensis*) .. .. 8. *libericus*

Mature branchlets and underside of leaves pubescent with spreading hairs :

Leaves ovate to suborbicular, 4–8 cm. long, 2·5–4 cm. broad, very obtusely and shortly acuminate, rounded at base ; outer petals pilose, up to 12 mm. long, with blade 1·5 mm. broad .. .. 9. *dahomensis*

Leaves oblong-ovate to elliptic, 8–13 cm. long, 3–5·5 cm. broad, distinctly acuminate, cuneate to obtuse at base ; outer petals rather shortly pubescent on the narrow blade, up to 15 mm. long .. .. 10. *stenopetalus*

Outer petals subulate, 15 mm. long, acute, subterete, with broadened thickened base ; leaves oblong-lanceolate 5–10 cm. long, 2–4 cm. broad, rounded at base, obtusely acuminate, pilose on midrib beneath ; branchlets very hispid with rust-coloured hairs.. .. .. 11. *hispidus*

1. **A. jollyanus** *Pierre ex Engl. & Diels* Monogr. Afr. Annonac. 73 (1901).
Iv.C.: Dabou (Nov.) *Jolly* 157 ! Also in French Cameroons.

2. **A. thomsonii** *Oliv.* F.T.A. 1 : 28 (1868). Scandent shrub to 45 ft. high, flowers yellow.
S.Nig.: Calabar (Feb.) *Thomson* 25 ! 2310 ! Oban *Talbot* 1407 ! Eket *Talbot* 3228 ! 3230 ! Also in French Cameroons, Gabon and Upper Congo.

3. **A. insignis** *Engl. & Diels* in Engl. Bot. Jahrb. 39 : 483 (1907). *A. lucidus* A. Chev. Bot. 9, name only. Forest liane with large yellow flowers.
S.L.: Gegbwema (Apr.) *Deighton* 3662 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Atroni, W. Ashanti (Aug.) *Vigne* 2446 ! Owabi (fl. & fr. Dec.) *Lyon* FH 2661 ! Also in French Cameroons, Gabon and Belgian Congo.

4. **A. coccineus** *Keay* in Kew Bull. 1952 : 149 (1952). Small liane, with yellowish-green flowers and brilliant scarlet fruits.
S.Nig.: Ibadan South F.R. (fl. Sept., fr. Jan.) *Keay* FHI 19799 ! 28041 !

5. **A. oliganthus** *Engl. & Diels* Monogr. Afr. Annonac. 73 (1901). *A. rubicunda* A. Chev. Bot. 9, name only A climbing shrub, fruit red when ripe.
Lib.: *Cook* 102 ; 183. Grand Bassa, in wet patches of forest near seashore (Oct.) *Dinklage* 2083 ! **Iv.C.:** Basin of the Haut-Nuon (fr. Apr.) *Chev.* 21297.

6. **A. macrophyllus** *Hook. f.*—F.T.A. 1 : 28. A small glabrous tree.
F.Po: *T. Vogel* 137 !

7. **A. velutinus** *Sc. Elliot* in J. Linn. Soc. 30 : 71 (1894). *A. nigericus* Hutch. in Kew Bull. 1921 : 356 ; F.W.T.A., ed. 1, 1 : 54. *A. djalonis* A. Chev. Bot. 8, name only. Scandent shrub or liane, with yellowish flowers.
Fr.G.: Kouroussa (Nov.) *Pobéguin* 590 ! **S.L.:** Falaba (Mar.) *Sc. Elliot* 5137 ! Bumbuna (fr. Oct.) *Thomas* 3676 ! Musaia (fr. Dec.) *Deighton* 4453 ! **G.C.:** Akumadan (Oct.) *Vigne* 2558 ! **N.Nig.:** Naraguta (Aug.) *Lely* 541 ! (See Appendix, p. 3.)

8. **A. libericus** *Diels* in Engl. Bot. Jahrb. 53 : 446 (1915). Shrub, with weak trailing branches ; flowers greenish-yellow.
Lib.: *Cook* 102 ; 183. Between Jenneh and Cabiola (Apr.) *Dinklage* 2567.

9. **A. dahomensis** *Engl. & Diels* in Notizbl. Bot. Gart. Berl. 2 : 299 (1899) ; Chev. Bot. 8.
Dah.: *Newton.* Allada, in fringing forest (Feb., Mar.) *Chev.* 23434 ! **S.Nig.:** Aguku *Thomas* 1399 !

10. **A. stenopetalus** *Engl. & Diels* l.c. 300 (1899). Forest liane, flowers yellow.
G.C.: Kumasi (Mar.) *Vigne* 1001 ! 1652 ! 3737 ! Bobiri F.R. (Jan.) *Andoh* FH 5092 ! **S.Nig.:** *Foster* 316 ! Also in French Cameroons, Gabon and Belgian Congo.

11. **A. hispidus** *Sprague & Hutch.* in Kew Bull. 1916 : 149.
S.L.: Roruks (Nov.) *Thomas* 5770 ! Magbile (Dec.) *Thomas* 6154 !

Species 7–10 are very close and some may not prove to be distinct. I have not seen authentic material of *A. libericus* Diels and *A. dahomensis* Engl. & Diels.—R.W.J.K.

7. XYLOPIA Linn.—F.T.A. 1 : 29 ; Engl. & Diels Monogr. Afr. Annonac. 57 (1901).

Flower-buds ovoid or ovoid-globose ; outer petals more or less ovate, almost as broad as long :

Buds rounded at apex ; calyx spreading, with ovate-triangular lobes about 5 mm. long ; pedicels about 1 cm. long ; leaves obovate-elliptic, subcuneate at base, 9–16 cm. long, 4–7·5 cm. broad, strongly reticulate .. .. .. 1. *africana*

Buds subacute at apex ; calyx small, very shallowly lobed, lobes about 2–3 mm. long ; pedicels about 3–4 mm. long ; leaves as above but smaller .. .. 2. *staudtii*

Flower-buds lanceolate to linear, more or less pointed ; outer petals more or less linear :

Inner petals (about 6 mm. long) much shorter than the outer (about 35 mm. long) ; leaves coriaceous, ovate-elliptic, 9–24 cm. long, 4–9 cm. broad, very shortly puberulous beneath, finely reticulate, lateral nerves faint, about 10 pairs, often rust-coloured ; carpels about 10, narrow, 6–10 cm. long .. .. 3. *rubescens*

Inner and outer petals subequal :

Outer petals 1–1·7 cm. long ; flowers clustered, often nodding or reflexed in bud ; leaves cuneate at base, almost glabrous beneath, up to 13 cm. long and 6 cm. broad, obovate ; carpels few, stipitate, about 5 cm. long and 1 cm. diam. 4. *quintasii*

Outer petals 2·5 cm. or more long ; flowers clustered or solitary, usually erect :

Branchlets and leaves densely pilose with spreading hairs ; flowers shortly pedicellate :

Leaves cuneate at base, ovate-lanceolate, 5–9 cm. long, 2–3 cm. broad ; flowers solitary, pedicels about 5 mm. long ; outer petals about 2·5 cm. long 5. *elliotii*

Leaves rounded or obtuse at base ; pedicels very short :

Flowers usually fasciculate, petals with appressed hairs ; leaves oblong-lanceolate, rounded or obtuse at base, acute at apex, 6–13 cm. long, 2–4 cm. broad ; carpels several, sessile, thick, about 6 cm. long and 2 cm. broad, velutinous 6. *villosa*

Flowers solitary, petals with long spreading hairs ; leaves similar to above but thinner and with a long acumen (about 1 cm.) .. .. 7. *talbotii*

Branchlets and leaves at the most thinly pilose or pubescent or appressed pilose when young, glabrescent ; flowers with short or long pedicels :

Pedicels long and very slender, 1–1·5 cm. long, petals narrowly linear with broad base, outer ones 4–4·5 cm. long ; carpels few, subsessile, short and thick, 3–4 cm. long and 1·2–1·5 cm. diam. ; leaves ovate-elliptic, obtuse or slightly acuminate, rounded at base, 3–8·5 cm. long and 2–3·5 cm. broad, petiole about 6 mm. long 8. *parviflora*

Pedicels short, or if up to 1 cm. then rather stout and petals not very narrow :

Carpels very numerous (25 or more), narrow, 5–6 cm. long and 4–6 cm. broad ; leaves elliptic to oblong, gradually acuminate, obtuse or rounded at base, up to 15 cm. long and 6 cm. broad, appressed pilose beneath when young, becoming rather shining above and glaucous beneath, reticulate ; outer petals about 5 cm. long, thick and gradually narrowed to the apex ; pedicels stout, up to 1 cm. long.. .. .. 9. *aethiopica*

Carpels fewer (5–10), shorter and relatively stout, about 3 cm. long and 1 cm. diam. ; leaves ovate-elliptic to lanceolate, obtusely acuminate, obtuse or rounded at base, 4·5–10 cm. long, 2–3·7 cm. broad, thinly pilose beneath, glabrescent, midrib above hirsute ; outer petals about 4·5 cm. long ; flowers solitary and sessile .. .. 10. *acutiflora*

1. **X. africana** (*Benth.*) *Oliv.* F.T.A. 1 : 30 (1868) ; Engl. & Diels Monogr. Afr. Annonac. 59, partly. *Melodorum africanum* Benth. (1862). A tree of montane forest, 30–40 ft. high, with dark crimson veins on the leaves beneath ; olive-brown silky buds.
S.Nig.: Ikwette Plateau, Obudu (fl. & fr. Dec.) *Keay & Savory* FHI 25179 ! **Br.Cam.:** Buea, 3,000 ft. (fl. & fr. Jan.) *Maitland* 233 ! Cam. Mt., 4,000 ft. (Feb.) *Mann* 1193 ! Also in S. Tomé.

2. **X. staudtii** *Engl. & Diels* in Notizbl. Bot. Gart. Berl. 2 : 298 (1899). Forest tree to 150 ft. high, with buttresses and stilt roots.
S.L.: Kambui (Aug.) *Aylmer* 596 ! **Lib.:** Firestone Plantation No. 3 (fl. & fr. Aug.) *Cooper* 66 ! Dukwia R. (fr. Feb., Mar.) *Cooper* 60 ! 139 ! **G.C.:** Abosso (Aug.) *Vigne* 982 ! Achembrom, Prestea (July) *Vigne* 1268 ! **S.Nig.:** Calabar Prov. (Nov.) *Rosevear* C. 21 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 530 ! Also in French Cameroons, Gabon and Angola. (See Appendix, p. 9.)

3. **X. rubescens** *Oliv.* F.T.A. 1 : 30 (1868) ; Engl. & Diels Monogr. 60. *X. humilis* Engl. & Diels (1901). *X. zenkeri* Engl. & Diels (1907). A forest tree, up to 90 ft. ; leaves coriaceous, drying reddish ; fruit-carpels slender, stoutly stipitate, cylindric, slightly twisted, with shallow constrictions.
Lib.: Grand Bassa *Dinklage* 2006 ! **Iv.C.:** Sanvi, Assinie (Apr.) *Chev.* 16321 ! Banco *Aubrév.* 507 ! **S.Nig.:** Sapoba *Kennedy* 205 ! 2821 ! Calabar *Thomson* 53 ! (See Appendix, p. 9.)

4. **X. quintasii** *Engl. & Diels* Monogr. 62 (1901). *X. striata* Engl. (1904). *X. lane-poolei* Sprague & Hutch. (1916). *X. parviflora* of Chev. Bot. 15, partly. A forest tree, to 90 ft. high, with clean straight bole and easily stripped bark ; flowers cream.
S.L.: Kessewe (Apr.) *Lane-Poole* 123 ! Heddles Farm (Apr.) *Lane-Poole* 210 ! Njala (Feb.) *Deighton* 4153 ! **Lib.:** Dukwia R. *Cooper* 222 ! **Iv.C.:** Bouroukrou (Dec.-Jan.) *Chev.* 16118 ! Abidjan *Aubrév.* 38 ! **G.C.:** Adeambra (May) *Vigne* 856 ! Tanosu (fr. Sept.) *Brent* 389 ! **S.Nig.:** Omo F.R. (Mar.) *Jones & Onochie* FHI 17012 ! Sapoba *Kennedy* 702 ! Oban *Talbot* 1302 ! Also in Cameroons and S. Tomé. (See Appendix, p. 9.)

5. **X. elliotii** *Engl. & Diels* Monogr. 65 (1901) ; Aubrév. Fl. For. C. Iv. 1: 112. A small forest tree, to 30 ft. high, with sweet-scented flowers.
Fr.G.: Niger bank *Sc. Elliot* 5325 ! **S.L.:** Falaba (Mar.) *Sc. Elliot* 5288 ! **Iv.C.:** Abidjan (Feb.) *Aubrév.* 891.

6. **X. villosa** *Chipp* in Kew Bull. 1923 : 183. *X. macrocarpa* A. Chev. Bot. 15, name only. A forest tree, to 80 ft. high and 4 ft. girth.
Iv.C.: Etérokrou to Tchumkrou (fr. Dec.) *Chev.* 22516 ! Abidjan (Jan.) *Aubrév.* 198 ! **G.C.:** Dunkwa *Vigne* 81 ! Jimira F. R. (Oct.) *Vigne* 3113 ! **S.Nig.:** Ibadan F.R. (Nov.) *Punch* 119 ! Benin Dist. *Kennedy* 415 ! 417 ! Sapoba (Nov.) *A. F. Ross* 236 ! Degema *Talbot* 3775 ! (See Appendix, p. 9.)

7. **X. talbotii** *Exell* in J. Bot. 69 : 98 (1931). *X. villosa* of F.W.T.A., ed. 1, 1 : 53, partly. Forest tree or shrub.
S.Nig.: Eket *Talbot* 3209 ! Oban *Talbot* 1601 !

8. **X. parviflora** (*A. Rich.*) *Benth.* in Trans. Linn. Soc. 23 : 479 (1862) ; F.T.A. 1 : 31 ; Engl. & Diels Monogr. 64 ; not of Spruce (1861), name only. *Uvaria parviflora* A. Rich. in Guill. & Perr. Fl. Seneg. 9 (1831). *X. vallotii* Chipp ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 53 (1927) ; Kew Bull. 1927 : 152 ; Exell in J. Bot. 64, Suppl. Polypet. 8 (1926), name only. Small tree or shrub of forests, especially fringing forests ; common throughout the area. Petals with crimson base and yellow green tails. Ripe carpels, green outside, dehiscent, bright pink within, seeds green.
Sen.: Casamance *Perrottet* 7 ! **S.L.:** Karene Dist. *Sc. Elliot* 5730 ! Njala (Feb.) *Deighton* 1081 ! **Lib.:** Peahtah (fl. & fr. Oct.) *Linder* 910 ! 1017 ! 1115 ! **Iv.C.:** Comoe (Jan.) *Aubrév.* 667 ! **G.C.:** Tano R. (Dec.) *Talmie* 84 ! **Togo:** Kete-Krachi (fl. & fr. June) *Vigne* 3883 ! **Dah.:** between Savé and Agouagon (fr. May) *Chev.* 23586 ! **N.Nig.:** Nupe *Barter* 1035 ! Lokoja *Barter* 426 ! Anara F. R., Zaria (Oct.) *Keay* FHI 20129 ! **S.Nig.:** Olokemeji (fl. & fr. Oct.) *Foster* 99 ! *Keay* FHI 28044 ! Extending to A.-E. Sudan, Uganda and Angola. (See Appendix, p. 8.)

9. **X. aethiopica** (*Dunal*) *A. Rich.*—F.T.A. 1 : 32 ; Engl. & Diels Monogr. 60. *Unona aethiopica* Dunal (1817). *X. eminii* of Chev. Bot. 15, not of Engl. A tree, up to 60 ft. high with greenish-white fragrant flowers ; fruit a cluster of very numerous narrow dark brown carpels.
Sen.: Niayes (Dec.) *Chev.* 2545 ! **Gam.:** *Ingram* ! **Fr.G.:** Rio Nunez *Heudelot* ! Conakry *Maclaud* 189 ! **S.L.:** *Sc. Elliot* ! Waterloo (June) *Lane-Poole* 319 ! **Lib.:** Grand Bassa *Dinklage* 2005 ! Dukwia R. (fr. Feb.) *Cooper* 174 ! **Iv.C.:** Bouaké *Aubrév.* 828 ! **G.C.:** *Eady* ! **Togo:** Alavanyo (Nov.) *St. Clair Thompson* 3656 ! *Kersting* A. 181 ! **Dah.:** Adjara *Chev.* 22747 ! **S.Nig.:** Eppah *Barter* 3268 ! Nun R. *Mann* 485 ! Eket *Talbot* 3281 ! Calabar (Mar.) *Holland* 296 ! Also in Gabon and Principe. The closely related *X. eminii* Engl. is widespread in E. Africa. (See Appendix, p. 8.)

10. **X. acutiflora** (*Dunal*) *A. Rich.*—F.T.A. 1 : 32 ; Engl. & Diels Monogr. 63. *Unona acutiflora* Dunal (1817). *X. oxypetala* (DC.) Oliv. ex Engl. & Diels Monogr. l.c. *X. thomsonii* Oliv. F.T.A. 1 : 31 (1868). *X. dinklagei* Engl. & Diels l.c. A shrub or small tree of forest ; fruits scarlet.
S.L.: *Afzelius* ! Bagroo R. (Apr.) *Mann* 14 ! Kumrabai (Dec.) *Thomas* 6972 ! Near Dodo (Apr). *Deighton* 3908 ! **Lib.:** Grand Bassa (May) *Dinklage* ! **Iv.C.:** Ebrie Lagoon *Aubrév.* 1537 ! **G.C.:** Kumasi *Cummins* 117 ! **Togo:** Sihabola (Mar.) *Kersting* 67 ! **S.Nig.:** Lagos (Dec.) *Dalz.* 1144 ! Sapoba *Kennedy* 2276 ! Old Calabar *Thomson* 63 ! Cross R. (Mar.) *Johnston* ! Oban *Talbot* 1353 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 504 ! Bamenda 3,000–3,500 ft. (May) *Maitland* 1731 ! *Johnstone* 70/31 ! Also in French Cameroons and Ubangi-Shari-Chad. (See Appendix, p. 8.)

Imperfectly known species.

X. sp. Forest tree " with red upper bark."
S.Nig.: Okwango, Ikom (fl. Nov., fr. Dec.) *Catterall* 51 ! 61 !

8. NEOSTENANTHERA Exell in J. Bot. 73, Suppl. Polypet. 5 (1935). *Stenanthera* Engl. & Diels (1900), not of R. Br. (1810).

Leaves closely appressed puberulous and glaucous beneath ; branchlets and pedicels sparingly pubescent, the latter only slightly thickened towards the apex ; outer petals up to 3 cm. long :

Leaves rounded at base, elongate-oblong to broadly oblanceolate, 15–30 cm. long, 5–10 cm. broad, with about 15 pairs of lateral nerves ; outer petals up to 2·5 cm. long ; fruiting carpels very numerous, ovoid, about 6 mm. long (? mature), not ribbed, on stipes about 5 mm. long .. .. 1. *myristicifolia*

Leaves cuneate to obtuse at base, oblong-obovate, 9–16 cm. long, 3–6 cm. broad, with 7–12 pairs of lateral nerves ; outer petals up to 3 cm. long ; fruiting carpels ellipsoid, up to 25 mm. long and 5 mm. broad, longitudinally ribbed, on stipes 5–15 mm. long 2. *gabonensis*

Leaves more or less densely rusty pubescent with spreading hairs beneath, especially on midrib and nerves ; branchlets and pedicels densely rusty tomentose, the latter markedly thickened towards the apex ; leaves oblong-elliptic, 7–14 cm. long, 3·5–5 cm. broad, with 8–10 pairs of lateral nerves ; outer petals up to 7 cm. long ; fruiting carpels ellipsoid, rusty tomentose, up to 20 mm. long and 11 mm. broad, not ribbed, on stipes 1–8 cm. long .. .. 3. *hamata*

1. **N. myristicifolia** (*Oliv.*) *Exell* in J. Bot. 73, Suppl. Polypet. 6 (1935). *Oxymitra myristicifolia* Oliv. F.T.A. 1 : 33. *Stenanthera myristicifolia* (Oliv.) Engl. & Diels Monogr. Afr. Annonac. 67 ; F.W.T.A., ed. 1, 1 : 56. Slender-stemmed forest tree, to 15 ft. high ; flowers green at first, yellow when mature ; fruits green.
S.Nig.: Newi (fr.Jan.) *Kitson* ! Okomu F. R. (fl. & fr. Feb.) *Brenan* 9015 ! 9015*a* ! Sapoba (May) *Ainslie* 308 ! Calabar *Thomson* 134 ! Also in French Cameroons. (See Appendix, p. 6.)

2. **N. gabonensis** (*Engl. & Diels*) *Exell* l.c. 6 (1935). *Oxymitra gabonensis* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2 : 297 (1899). *Stenanthera gabonensis* (Engl. & Diels) Engl. & Diels Monogr. 68, t. 24a. *Stenanthera bakuana* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 56 (1927) ; Chev. Bot. 15, name only ; Aubrév. Fl. For. C. Iv. 1 : 118, t. 40b. *N. bakuana* (A. Chev. ex Hutch. & Dalz.) Exell l.c. Shrub or small tree to 25 ft. high in forest.
Lib.: Dukwia R. (Mar., May) *Cooper* 306 ! 416 ! Gbanga (fr. Sept.) *Linder* 560 ! **Iv.C.:** Banco (Jan.)

Aubrév. 884 ! 1936 ! Bingerville *Chev.* 15429 ! **G.C.:** Ankasa, W. P. (fr. Dec.) *Vigne* 3173 ! Aguna (Aug.) *Vigne* 1308 ! Dunkwa, W. P. (fr. Oct.) *Akpabla* 870 ! Also in Gabon.

3. **N. hamata** (*Benth.*) *Exell* l.c. 6 (1935). *Oxymitra hamata* Benth.—F.T.A. 1 : 33. *Stenanthera hamata* (Benth.) Engl. & Diels Monogr. 68, t. 24b ; F.W.T.A., ed. 1, 1 : 56 ; Aubrév. l.c. 1 : 116, t. 40a. *N. yalensis* Hutch. & Dalz. ex Cooper & Record in Yale Univ. For. Bull. 31 : 17 (1931) ; F.W.T.A., ed. 1, 2 : 605 (1936). Tree to 50 ft. high, in forest.

S.L.: Bagroo R. (Apr.) *Mann* 876 ! Sherbro *Sc. Elliot* 5861 ! Port Loko (Dec.) *Thomas* 6677 ! Kambui (fr. Aug.) *Edwardson* 144 ! **Lib.:** Dukwia R. (fl. & young fr. Apr.) *Cooper* 371 ! **Iv.C.:** Sanvi, Aboisso (Apr.) *Chev.* 16306 ! Banco (fr. June) *Aubrév.* 463 ! Danané (Mar.) *Chev.* 1096 ! **G.C.:** Ankasa F.R. (fr. Dec.) *Vigne* 3163 ! Neung F.R., Tarkwa (fr. Feb.) *Kellas* FH 5105 !

9. POLYALTHIA Blume—F.T.A. 1 : 26.

Hairs on young shoots sparse and appressed ; leaves ovate-oblong, tapering at apex into a long acumen, cuneate at base, 10–20 cm. long, 4·5–7·5 cm. broad ; petals 10–12 mm. long ; fruit of several stipitate, globose carpels, 5–8 mm. diam. 1. *oliveri*

Hairs on young shoots dense and spreading ; leaves oblong, acuminate, cuneate at base, 9–14 cm. long, 3·5–5 cm. broad ; petals 2 cm. long ; fruit as above, but carpels 10–13 mm. diam. .. .. 2. *sauveolens*

1. **P. oliveri** *Engl.*—Engl. & Diels Monogr. Afr. Annonac. 42 ; Chev. Bot. 10. *P. acuminata* Oliv.—F.T.A 1 : 26, not of Thwaites. A forest tree, with high crown and clean straight bole, up to 40 ft. high ; flowers greenish-white ; fruiting carpels red at first then black.

S.L.: Bagroo R. (Apr.) *Mann* 841 ! Bandajuma (May) *Aylmer* 77 ! Gola Forest (Apr.) *Deighton* 3683 ! Powana (fr. Dec.) *Burbridge* 431 ! **Lib.:** Sinoe Basin *Whyte* ! Dukwia R. (fr. Jan.) *Cooper* 208 ! Grand Bassa (Apr.) *Dinklage* 1639 ! Banga (fr. Oct.) *Linder* 1213 ! **Iv.C.:** Banco (fr. Jan.) *Martineau* 318 ! **G.C.:** Amentia (Mar.) *Vigne* 1863 ! Pra River station (Feb.) *Vigne* 1048 ! Bobiri F.R. (Jan.) *Andoh* FH 5458 ! **S.Nig.:** Calabar *Thomson* 109 ! Arochuku *Akpata* FHI 3933 ! Also in French Cameroons and Gabon. (See Appendix, p. 6.)

2. **P. sauveolens** *Engl. & Diels* l.c. 42 (1901) ; Kennedy For. Fl. S.Nig. 11. Forest tree with straight bole, to 65 ft. high.

S.Nig.: Sapoba (Aug.-Oct.) *Kennedy* 1544 ! 1617 ! Okomu F.R. (fr. Feb.) *Brenan* 9112 ! Afi River F.R. *Keay* ! Extends to Belgian Congo and Angola. (See Appendix, p. 7.)

10. POPOWIA Endl.—Engl. & Diels Monogr. Afr. Annonac. 43 (1901).

Flowers unisexual ; male borne on leafy shoots in cymes 2–3 cm. diam. ; female in dense many-flowered cymes 7–15 cm. diam., on leafless branches of several season's growth ; leaves oblong-elliptic to oblong-obovate, 7–23 cm. long, 3·5–8 cm. broad ; fruiting carpels torulose with 1–6 ellipsoid seeds :

Stem and under surface of leaves densely hirsute ; male flowers in slender cymes ; male buds 2–3 mm. diam. .. .. 1. *declina*

Stem puberulous or tomentellous ; leaves puberulous or glabrous beneath ; male flowers in robust cymes ; male buds 3·5–4 mm. diam. .. .. 2. *cauliflora*

Flowers hermaphrodite ; flowers solitary, paired, or in few-flowered cymes or lax racemes, usually on leafy branches :

Bracteole large, foliaceous, suborbicular, amplexicaul, 8–13 mm. diam. ; flowers solitary, extra-axillary, pedicel 2·5–4 cm. long ; leaves oblong-elliptic, rounded to subcordate at base, obtuse at apex, 3·5–10 cm. long, 1·5–4·5 cm. broad 3. *littoralis*

Bracteole small, less than 5 mm. long :

Sepals much shorter than the petals, more or less triangular, not more than 3 mm. long ; buds globose :

Flowers in few-flowered cymes on woody branches below the leaves ; inflorescence, sepals and petals rusty tomentellous ; leaves subelliptic, rounded at base, obtuse at apex, 10–16 cm. long, 4·5–6·5 cm. broad, sparsely puberulous and greyish beneath ; carpels with 2 ovules .. .. 4. *whytei*

Flowers solitary, mainly among the leaves on the current season's growth :

Segments of the fruiting carpels cylindrical, 1·5–2·5 cm. long ; leaves elliptic to obovate-elliptic, rounded to subcordate at base, obtuse or shortly acuminate at apex, 4·5–17 cm. long, 2·5–6·5 cm. broad ; pedicel 5–7 mm. long 5. *congensis*

Segments of the fruiting carpels globose to shortly ellipsoid, 5–10 mm. long ; leaves up to 7·5 cm. long and 3 cm. broad :

Pedicel 12–25 mm. long, borne about 1 mm. above the axil on the same side of the stem as the leaf ; leaves oblong, rounded at base, acute to obtuse at apex, 5–7·5 cm. long, 2–3 cm. broad ; fruiting carpels 1-seeded .. 6. *nimbana*

Pedicel 2·5–5 mm. long, borne more or less at the node on the side of the stem opposite to the leaf ; leaves oblanceolate to oblong-elliptic, rounded to subcordate at base, obtuse to rounded and slightly emarginate at apex, 2·5–7·5 cm. long, 1·5–3·5 cm. broad ; fruiting carpels 1–5-seeded .. 7. *oliveriana*

Sepals at least 5 mm. long, more than half as long as the petals, lanceolate or ovate-lanceolate ; buds ovoid :

Stem and leaves sparingly puberulous ; leaves broadly oblanceolate, obtuse at base, acutely and rather broadly acuminate, 5–13 cm. long, 2–4 cm. broad ; flowers axillary, solitary, pedicels about 1·5 cm. long ; sepals and outer petals about 5 mm. long .. .. 8. *stenosepala*

Stem and leaves densely long-hirsute ; leaves oblong to oblong-elliptic, cordate or subcordate at base, obtuse or shortly acuminate at apex, 11–19 cm. long, 4·5–7·5 cm. broad ; flowers in axillary few-flowered lax racemes, with rhachis up to 13 cm. long, rarely solitary or paired ; sepals 5–10 mm. long, outer petals 8–15 mm. long .. .. 9. *filamentosa*

1. **P. declina** *Sprague* Chipp in Kew Bull. 1923 : 182 ; Sprague in Kew Bull. 1908 : 53, partly ; Boutique in Fl. Congo Belge 2 : 343 (1951). *Clathrospermum mannii* Oliv. F.T.A. 1 : 25, partly (male spec.). *P. mannii* of Engl. & Diels Monogr. Afr. Annonac. 45, partly, not of Baill. *P. ferruginea* of Cooper & Record in Yale Univ. For. Bull. 31 : 17 (1931), not of Engl. Liane.
   Lib.: Dukwia R. *Cooper* 199 ! Also in French Cameroons, Gabon and Belgian Congo.
2. **P. cauliflora** *Chipp* l.c. (1923) ; Boutique l.c. 2 : 344. *Clathrospermum mannii* Oliv. F.T.A. 1 : 25, partly (female spec.). *P. mannii* of Engl. & Diels l.c., partly, not of Baill. *P. declina* Sprague in Kew Bull. 1908 : 53, partly. A lofty-climbing shrub.
   S.Nig.: Calabar *Thomson* ! Oban *Talbot* ! Also in French Cameroons, Gabon and Belgian Congo.
3. **P. littoralis** *Bagshawe & Bak. f.* in J. Bot. 46 : 221 (1908) ; Boutique l.c. 2 : 347 (1951). Shrub or small tree.
   Br.Cam.: Bambui, Bamenda (June) *Maitland* 1618 ! Also in Gabon, Belgian Congo and Uganda.
4. **P. whytei** *Stapf* in Johnston Lib. 2 : 575 (1906). *P. prehensilis* A. Chev. Bot. 11, name only. A shrub, erect or climbing ; flowers yellowish ; fruit yellow.
   Lib.: Sinoe Basin *Whyte* ! **Iv.C.:** Bingerville (young fr. Dec.) *Chev.* 16048. Guébo to Mbago (fr. Feb.) *Chev.* 17077. Byanouan Soubiré (Mar.) *Chev.* 17701.
5. **P. congensis** (*Engl. & Diels*) *Engl. & Diels* l.c. 44 (1901) ; Boutique in Fl. Congo Belge 2 : 352 (1951). *Annona congensis* Engl. & Diels (1899). *P. heudelotii* of F.W.T.A., ed. 1, 1 : 55 and of Engl. & Diels Monogr. Afr. Annonac. 51, partly, not of Baill. A scandent shrub, up to 6 ft. ; fruit yellow, orange or red.
   S.L.: Ronietta (fr. Aug.) *Thomas* 1642 ! Jigaya (fr. Sept.) *Thomas* 2705 ! **Lib.:** Zigida (Mar.) *Bequaert* 140 ! **Iv.C.:** Guidéko (fr. June) *Chev.* 19490 ! **S.Nig.:** Gambari F.R., Ibadan (fr. Aug.) *Onochie* FHI 19139 ! Onitsha (fr. May) *Barter* 1335 ! *Unwin* 49 ! Degema *Talbot* 3726 ! 3727 ! Also in Ubangi and Belgian Congo.
6. **P. nimbana** *Schnell* in Bull. Inst. Fr. Afr. Noire 15 : 93, t. 1 (1953). Slender scandent shrub ; leaves glaucous beneath ; in montane forest.
   Fr.G.: Mt. Nimba, 4,000–5,100 ft. (fl. Apr., fr. Feb., Sept.) *Schnell* 3516 ! 5202 ! 4399. Mt. Ziama, 4,200 ft. (fl. May, fr. Feb.) *Schnell* 2636 ! 4541.
7. **P. oliveriana** *Exell & Mendonça* in Consp. Fl. Ang. 1 : 24 (1937) ; Boutique l.c. 2 : 353. *Unona parvifolia* Oliv. F.T.A. 1 : 36. *P. parvifolia* (Oliv.) Engl. & Diels l.c. 46 (1901), not of Kurz (1875).
   Fr.Sud.: R. Niger, Bamako *Chev.* 25908 ! **Fr.G.:** Kouroussa *Pobéguin* 823 ! Also in Ubangi, Belgian Congo, N. Rhodesia and Angola.
8. **P. stenosepala** *Engl. & Diels* Monogr. Afr. Annonac. 49 (1901). Shrub ; fruiting carpels 1–2-seeded.
   S.L.: Madina, Limba (Apr.) *Sc. Elliot* 5564 ! Port Loko (Apr.) *Sc. Elliot* 5882 ! Mayosso (fr. Aug.) *Thomas* 1446 !
9. **P. filamentosa** *Diels* in Engl. Bot. Jahrb. 39 : 478 (1907) ; Boutique l.c. 2 : 356. Liane with golden-brown hair on shoots ; leaves metallic grey beneath ; calyx green, outer petals pale brown, inner petals rich pink.
   S.Nig.: Aboabam (Dec.) *Keay* FHI 28187 ! **Br.Cam.:** Bulifambo, Buea (Mar.) *Maitland* 566 ! Also in French Cameroons, Ubangi and Belgian Congo.

Imperfectly known species.

Talbot 41 from Oban, S. Nigeria recorded as *Popowia vogelii* (Hook. f.) Baill. in Ed. 1, is possibly *P. lucidula* (Oliv.) Engl. & Diels (see Boutique l.c. 351), but there can be no certainty as the specimen lacks flowers and the species is not otherwise known from our area.

Note—species 8 and 9 differ somewhat from the other species of *Popowia* and may perhaps represent distinct genera.

11. **OXYMITRA** Hook. f. & Thoms.—Sprague & Hutch. in Kew Bull. 1916 : 153.

Pedicels slender, about 2 cm. long or more ; branchlets more or less glabrous :

Leaves shortly acuminate, acumen not much more than 1 cm. long :

Flowers in fascicles of about 3 ; pedicels about 3 cm. long ; leaves subacute at base, oblong, 7–15 cm. long, 3–5 cm. broad, pale glaucous-green beneath, glabrous ; petals minutely pubescent, the outer 7–8 mm. long, triangular ; fruit ribbed, about 2 cm. long, glabrous .. .. 1. *longipedicellata*

Flowers solitary ; pedicels about 2 cm. long :

Leaves obovate, rounded or obtuse at base, 7–11 cm. long, 2·5–3·5 cm. broad, slightly hairy and more or less glaucous beneath ; outer petals ovate, 1·2 cm. long, minutely pubescent ; inner petals connivent, about half as long as the outer ; fruiting carpels stipitate, 1–4-seeded, moniliform .. .. 2. *gracilis*

Leaves elliptic, rounded at base, 6–12 cm. long, 3–5 cm. broad, glabrous and glaucous beneath ; flowers small (seen only in the young stage) .. 3. *gracilipes*

Leaves acutely long-acuminate, acumen about 2 cm. long ; blade obovate-oblong, 7–14 cm. long, 2·5–4·5 cm. broad, more or less glaucous and minutely pubescent beneath ; outer petals lanceolate, 2 cm. long, puberulous, the inner connivent, less than half as long as the outer .. .. 4. *rosea*

Pedicels short and stoutish, about 1 cm. long or less ; branchlets more or less hirsute :

Leaves glabrous, very glaucous beneath ; oblong or oblong-elliptic, acutely long-acuminate, slightly cordate at base, 12–25 cm. long, 4–7 cm. broad, with numerous slender tertiary nerves ; inner petals glabrous ; fruiting carpels shortly stipitate, 1–2·5 cm. long, tomentellous .. .. 5. *glaucifolia*

Leaves pubescent or pilose on the nerves and veins beneath :

Leaves narrowed towards the base, oblong or oblong-oblanceolate, up to 6·5 cm. broad :

Branchlets shortly and densely tomentose ; leaves oblong-elliptic to oblong-oblanceolate, shortly and obtusely acuminate, subcordate at base, 9–18 cm. long ; outer petals ovate-lanceolate, 1–1·3 cm. long, 5–6 mm. broad, tomentellous outside; inner petals about half as long .. .. 6. *velutina*

Branchlets loosely bristly pilose; leaves subsessile, 10–14 cm. long, slightly glaucous and laxly pilose on the nerves beneath; sepals broadly ovate, about 0·5 cm. long; outer petals ovate, 1·5 cm. long, nervose; inner petals glabrous 7. *obanensis*

Leaves broadly elliptic, rounded to a shortly cordate base, 8–12 cm. long, 3·5–8 cm. broad, acuminate to rounded or emarginate at apex, pilose on the nerves beneath; outer petals ovate, acute, 1·7 cm. long, silky and strongly nerved; fruiting carpels oblong, stipitate, 3·5 cm. long, hirsute .. .. 8. *hirsuta*

1. **O. longipedicellata** (*Bak. f.*) *Sprague & Hutch.* in Kew Bull. 1916: 154. *Oxymitra albida* var. *longipedicellata* Bak. f. in Cat. Talb. 3 (1913). A climbing shrub; petals yellowish, mauve inside at the base; fruits scarlet.
S.Nig.: Oban *Talbot* 1559! 1677! Afi River F.R. (fr. May) *Jones & Onochie* FHI 18634! **Br.Cam.:** Bulifambo, Buea, 2,500 ft. (Mar.) *Maitland* 536!

2. **O. gracilis** (*Hook. f.*) *Sprague & Hutch.* l.c. (1916). *Uvaria gracilis* Hook. f. in Fl. Nigrit. 210 (1849); F.T.A. 1: 22; Engl. & Diels Monogr. Afr. Annonac. 22. *O. platypetala* Benth.—F.T.A. 1: 33. *Cleistopholis platypetala* (Benth.) Engl. & Diels. *Unona millenii* Engl. & Diels; Chev. Bot. 10. Small liane with flattened stems, leaves metallic grey beneath; flowers dull greenish-purple.
S.L.: Bagroo R. (Apr.) *Mann* 857! Kambia (Jan.) *Sc. Elliot* 4382! **Lib.:** Banga (fr. Oct.) *Linder* 1212! **Iv.C.:** Bingerville *Chev.* 15433! **S.Nig.:** Lagos (fl. & fr. Mar.) *Millen* 149! *Dalz.* 1096! Akure F.R. (Nov.) *Keay* FHI 25599! Eket *Talbot* 3381!

3. **O. gracilipes** *Benth.*—F.T.A. 1: 33. A shrub, up to 25 ft. high with greenish-white petals. Probably very close to *O. albida* (Engl.) Sprague & Hutch.
F.Po: on the beach *Mann* 251!

4. **O. rosea** *Sprague & Hutch.* l.c. (1916). A shrub with flexuous grey branches covered with lenticels; flowers pendulous, bright pink.
S.Nig.: Oban *Talbot* 199!

5. **O. glaucifolia** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1: 57 (1927); Kew Bull. 1927: 153. A shrub.
S.Nig.: Oban *Talbot* 403! 1255!

6. **O. velutina** *Sprague & Hutch.* l.c. 156 (1916). Forest liane with flexuous rusty branches and red fruits.
S.L.: Yonibana (fl. & fr. Nov.) *Thomas* 4701! 5005! Makump (fr. July) *Thomas* 968! Near Roruks (fl. & fr. July) *Deighton* 2498!

7. **O. obanensis** (*Bak. f.*) *Sprague & Hutch.* l.c. (1916). *Unona obanensis* Bak. f. in Cat. Talb. 1 (1913). Shrub; inflorescence with a broad hairy bract at the base of the peduncle; outer petals apricot red, inner dull-orange.
S.Nig.: Oban *Talbot* 1246! 1323!

8. **O. hirsuta** (*Benth.*) *Sprague & Hutch.* l.c. 155 (1916). *Unona hirsuta* Benth.—F.T.A. 1: 35; Chev. Bot. 10. *Uvaria caillei* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1: 50; Chev. Bot. 5. Small forest liane, to 20 ft. high, outer petals green, inner brownish; vegetatively very like *Popowia filamentosa* Diels.
Fr.G.: Mamou (Nov.) *Chev.* 14817! Dalaba to Mamou (Jan.) *Chev.* 20341! **S.L.:** Talla Hills (fr. Feb.) *Sc. Elliot* 4854! **Iv.C.:** Bingerville *Chev.* 15428! Guidéko (May) *Chev.* 15408! **Br.Cam.:** Likomba (Dec.) *Mildbr.* 10777! **F.Po:** (Nov.) *Mann* 559!

12. POLYCERATOCARPUS Engl. & Diels Monogr. Afr. Annonac. 67 (1901).
Alphonseopsis Bak. f. in Cat. Talb. 3 (1913).

Leaves oblong to elliptic, glabrous above, glaucous beneath, apex acuminate, 18–23 cm. long, 4–7 cm. broad, main lateral nerves 9–11 pairs; pedicels up to 6 mm. long; bracteoles several; petals yellow, the outer up to 9 mm. long, the inner slightly smaller .. .. *parviflorus*

P. parviflorus (*Bak. f.*) *Ghesq.* in Rev. Zool. & Bot. Afr. 32: 140 (1939); Pellegr. in Bull. Soc. Bot. Fr. Mém. 1949: 68 (1950). *Alphonseopsis parviflora* Bak. f. in Cat. Talb. 3, t. 1 (1913); F.W.T.A., ed. 1, 1: 52. *Uvaria microtricha* of Chev. Bot. 7. *Uvaria scabrida* of F.W.T.A., ed. 1, 1: 50, partly. Small tree or shrub, to 20 ft. high; flowers creamy-white; leaves pale duck's egg blue beneath.
Iv.C.: Dyolas (fr. Apr.) *Chev.* 21343! Guidéko (fl. & fr. May, fr. June) *Chev.* 16423! 19032! **G.C.:** Atromi, W. Ashanti (Aug.) *Vigne* 2473! Nkinkaso (fr. Oct.) *Vigne* 2544! **S.Nig.:** Sapoba *Kennedy* 260! 772! 1980! Oban *Talbot* 1607! Also in Gabon.

13. UVARIODENDRON (Engl. & Diels) R. E. Fries in Act. Hort. Berg. 10: 51 (1931).

Flowers axillary, solitary among the leaves on relatively young shoots; leaves up to 40 cm. long and 7–12 cm. broad, elongate-obovate, rounded to slightly cuneate at base, abruptly acuminate, quite glabrous, usually with at least 20 pairs of lateral nerves, petiole 4–10 mm. long, stout; pedicel about 1·5 cm. long; sepals broadly ovate, about 1 cm. long, shortly tomentellous outside; outer petals broadly ovate, 2·5–2·8 cm. long, 2 cm. broad, shortly tomentellous; fruiting carpels glabrous, ellipsoid, about 4 cm. long, and 3 cm. broad .. .. .. 1. *connivens*

Flowers on older branches or trunk, well below the leafy shoots; fruiting carpels (where known) pubescent:

*Branchlets, petioles and midrib and nerves on lower surface of mature leaves glabrous, or sparsely appressed pubescent:

†Mature leaves up to 20 cm. long, with 8–16 pairs of lateral nerves, broadest at about the middle:

Leaves cuneate at base, 10–18 cm. long, 3–7 cm. broad, narrowly elliptic to lanceolate, gradually acuminate, with 8–11 pairs of lateral nerves rather obscure beneath; leaf-buds densely silky but leaves very soon glabrous; outer petals oblong-ovate, 2–2·5 cm. long, 1·2–1·4 cm. broad, densely silky outside; fruits not known .. .. 2. *angustifolium*

Leaves rounded at base, 12–20 cm. long, 3·5–6·5 cm. broad, elongate-elliptic, shortly and obtusely acuminate, with 14–16 pairs of lateral nerves prominent beneath; outer petals ovate, 1·5–1·7 cm. long, 1–1·2 cm. broad; fruit not known 3. *letestui*

†Mature leaves exceeding 20 cm. long, with more than 15 pairs of lateral nerves, broadest rather above the middle:

Mature leaves up to 50 cm. long and 13 cm. broad, with 15–20 pairs of lateral nerves, obtuse to cuneate at base:

Outer petals 2·5 3·5 cm. long, appressed pubescent outside, broadly ovate, 2–2·5 cm. broad; calyx with short triangular lobes leaving the petals almost completely exposed even in early bud stages; leaves 15–30 cm. long, 2·5–9 cm. broad, broadly oblong-oblanceolate, abruptly acuminate, lateral nerves prominent beneath and impressed above; leaf-buds densely pubescent, leaves appressed pubescent beneath, becoming glabrous when old; fruiting carpels cylindrical with transverse grooves, closely grey pubescent, about 4 cm. long and 1·8 cm. diam., stipes about 1 cm. long .. .. 4. *mirabile*

Outer petals 1·5–2·5 cm. long, long silky-pilose outside, suborbicular, 1·5–2 cm. broad; calyx cupular at first in bud and covering a large part of the corolla up to a late stage; leaves 20–50 cm. long, 5–13 cm. broad, oblong-oblanceolate, obtuse acuminate, lateral nerves not impressed above, leaf-buds densely pubescent, leaves soon glabrous except for appressed hairs on and by the midrib; fruit not known .. .. 5. *fuscum*

Mature leaves 40–60 cm. long, 10–20 cm. broad, with 25–30 pairs of lateral nerves, rounded at base, oblong-oblanceolate, shortly acuminate; flowers 7–8 cm. diam. 6. *giganteum*

*Branchlets, petioles and midrib and nerves on lower surface of leaves densely tomentose even when mature; leaves 40–60 cm. long, 12–20 cm. broad, oblanceolate, rounded at base, broadly rounded to almost truncate at apex but with abrupt acumen about 2 cm. long; flowers about 4 cm. diam., fruiting carpels velvety brown 7. *calophyllum*

1. **U. connivens** (*Benth.*) *R. E. Fries* in Act. Hort. Berg. 10: 55 (1931). *Uvaria connivens* Benth. in Trans. Linn. Soc. 23: 465 (1862); F.T.A. 1: 20; F.W.T.A., ed. 1, 1: 50. Understorey tree in forest, to 40 ft. high, sepals green, petals purple.
S.Nig.: Oban *Talbot* 62! 404! 1254! Aboabam, Ikom (Dec.) *Keay* FHI. 28191! **Br.Cam.:** Buea (Mar.) *Maitland* 537! Buea to Mayuko (fr. Feb.) *Dalz.* 8243! Ambas Bay (Feb.) *Mann* 763! **F.Po:** *Mann* 1159! Also in French Cameroons.

2. **U. angustifolium** (*Engl. & Diels*) *R. E. Fries* l.c. 58 (1931). *Uvaria angustifolia* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2: 295 (1899); F.W.T.A. ed. 1, 1: 50. Understorey tree, or shrub, of forest 15–40 ft. high; cauliflorous.
G.C.: Pra R., Ashanti (Feb.) *Vigne* 1610! Worobang F.R. (Jan.) *Vigne* 4318! **S.Nig.:** Owo F. R. *Jones* FHI 3480! Shasha F.R. *Lancaster* 13! **Br.Cam.:** Johann-Albrechtshöhe (Mar.) *Staudt* 642! 742*a*.

3. **U. letestui** (*Pellegr.*) *R. E. Fries* l.c. 60 (1931). *Uvaria letestui* Pellegr. in Bull. Mus. Hist. Nat. 26: 658 (1920). *Uvaria mannii* Hutch. & Dalz. in Kew Bull. 1927: 150; F.W.T.A., ed. 1, 1: 50. A shrub 15–20 ft. high; calyx green, corolla white with 4 dark purple spots at the base inside.
F.Po: *Mann* 257! Also in French Congo.

4. **U. mirabile** *R. E. Fries* l.c. 59 (1931). *Uvariodendron* sp. Aubrév. Fl. For. C. Iv. 1: 102, t. 37. Understorey tree with straight bole, to 30 ft. high, in forest; cauliflorous; petals yellow with red or violet markings within.
Iv.C.: Guiglo *Aubrév.* 1224! Agnéby (fr. Feb.) *Aubrév* 1780! **G.C.:** Ofin Headwaters F.R. (young fl. Nov., young fr. Apr.) *Vigne* 3417! *Andoh* FH 4171! Tano-Ofin F.R. (young fl. Jan.) *Lyon* 110! **S.Nig.:** Akure F.R. (fl. May, fr. Feb.) *Darko* 182! *Keay* FHI 19701! 24604! **Br.Cam.:** between Victoria and Bimbia (Mar.) *Preuss* 1378. Buea (Jan.) *Lehmbach* 178. Likomba *Mildbr.* 10720!

5. **U. fuscum** (*Benth.*) *R. E. Fries* l.c. 61 (1931). *Uvaria fusca* Benth. in Trans. Linn. Soc. 23: 466 (1862); F.T.A. 1: 20; F.W.T.A., ed. 1, 1: 50. Understorey tree of forest, to 30 ft. high; cauliflorous, sepals and petals brown outside, petals cream blotched with red inside.
Br.Cam.: *Kalbreyer* 4! Buea, 4,000 ft. (Mar.) *Maitland* 453! **F.Po:** 1,300 ft. *Mann* 308! Above Basilé, 1,900–2,600 ft. *Mildbr.* 6428.

6. **U. giganteum** (*Engl.*) *R. E. Fries* l.c. 62 (1931). *Uvaria gigantea* Engl. in Notizbl. Bot Gart. Berl. 2: 292 (1899), partly, not of Wall., name only. Forest tree, to 30 ft. high; cauliflorous, petals yellow, purple within.
Br.Cam.: Buea, by waterfall, 3,200 ft. (young fr. Apr.) *Lehmbach* 230.

7. **U. calophyllum** *R. E. Fries* l.c. 63 (1931). Tree or shrub in understorey of forest, 10–40 ft. high; cauliflorous, flowers almost sessile, in clusters of 2 or 3; bracts, calyx and outer whorl of petals dark velvety brown, inner petals yellow outside; all petals crimson-red within with broad yellow margins.
G.C.: Kwahu Prasu (Feb.) *Vigne* 1611! Tafo (Jan.) *Box* 3650! **S.Nig.:** Ibadan South F.R. (fr. Apr.) *Keay* FHI 22812! Ikom (Jan.) *Keay* FHI 28683! **Br.Cam.:** Kumba *Dundas* FHI 13989! Also in French Cameroons.

14. **UVARIASTRUM** Engl.—Engl. & Diels Monogr. Afr. Annonac 31 (1901); Sprague & Hutch. in Kew Bull. 1916: 159.

*Sepals broadly triangular; buds acutely angled and winged towards the apex:

Sepals sparsely pubescent or glabrescent outside, 17–25 mm. long, 8–19 mm. broad; outer petals 15–35 mm. long; pedicels 1·5–3 cm. long; leaves oblong-oblanceolate, 9–20 cm. long, 3–6 cm. broad, cuneate, acuminate, glabrous, with 10–15 pairs of lateral nerves prominent beneath, not impressed above; flowers on old twigs or trunk, solitary or several in a fascicle .. .. 1. *zenkeri*

Sepals densely pilose:

Sepals 18–30 mm. long, 10–20 mm. broad, shortly pilose; buds acute and markedly winged at apex; outer petals 23–42 mm. long, pedicels 1·5–7 cm. long; leaves

oblanceolate to obovate-elliptic, 5·5–16 cm. long, 3–5 cm. broad, cuneate at base, long-acuminate, sparsely pubescent, with 9–12 pairs of lateral nerves not impressed above ; flowers on old twigs, solitary or several together ; fruiting carpels oblong, up to 7 cm. long, 3 cm. broad and 2 cm. thick, densely tomentose, smooth
2. *pierreanum*

Sepals 10–18 mm. long, up to 10 mm. broad, densely long ferruginous pilose ; buds obtuse and only slightly winged at apex ; outer petals 1·5–2·5 cm. long, pedicels up to 1·5 cm. long ; leaves oblong-oblanceolate, 8–15 cm. long, 3–4·5 cm. broad, rounded at base, long-acuminate, pubescent on midrib beneath, with 8–12 pairs of lateral nerves, impressed above and prominent beneath ; flowers solitary, axillary, on leafy twigs and just below ; fruiting carpels cylindrical up to 9 cm. long and 2 cm. diam., acute at the apex, longitudinally ridged, pilose .. 3. *insculptum*

*Sepals ovate-lanceolate rounded at apex, early caducous ; buds not sharply angled and not winged ; flowers usually several together on short slender lateral branches, or more rarely solitary, supra-axillary :

Leaves more or less coriaceous, pubescent on the midrib above ; pedicels and sepals densely pilose :

Leaves very thick, densely brown-sericeous when young, lanceolate-elliptic, gradually long-acuminate, 12–24 cm. long, 4–7 cm. broad ; petals 18 mm. long
4a. *elliotianum* var. *sericeum*

Leaves somewhat thinner, and less densely hairy, obovate-elliptic rather abruptly acuminate, 8–20 cm. long, 2·5–6 cm. broad ; petals 14–16 mm. long
4. *elliotianum* var. *elliotianum*

Leaves chartaceous, almost glabrous from youth, midrib above glabrous ; pedicels and sepals thinly pubescent ; otherwise as var. *elliotianum*
4b. *elliotianum* var. *glabrum*

1. **U. zenkeri** *Engl. & Diels* in Engl. Bot. Jahrb. 39 : 473 (1907). *U. zenkeri* var. *nigritianum* Bak. f. in Cat. Talb. 3. Forest tree, to 90 ft. high.
S.Nig.: Oban *Talbot* 3 ! 1341 ! 1534 ! Also in French Cameroons.

2. **U. pierreanum** *Engl.* in Engl. & Diels Monogr. Afr. Annonac. 32, t. 10 (1901). Forest tree, to 90 ft. high ; sepals olive outside, pale green within, petals pale yellow.
G.C.: Atuma, N.W. Ashanti (Dec.) *Vigne* 3511 ! Amentia (Mar.) *Vigne* 1860 ! Akokoasu (fr. Aug.) *Hughes* FH 3381 ! **S.Nig.:** Okomu F.R. (Jan.-Mar.) *Richards* 3264 ! *Brenan* 8827 ! 8901 ! *Kennedy* 2571 ! Also in French Cameroons and Gabon.

3. **U. insculptum** (*Engl. & Diels*) *Sprague & Hutch.* in Kew Bull. 1916 : 159 ; Aubrév. Fl. For. C. Iv. 1 : 114, t. 38. *Uvaria insculpta* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2 : 295 (1899). Shrub or tree, in forest, up to 50 ft. high.
Iv.C.: Banco (fl. Mar., fr. June) *Aubrév.* 1331 ! 1341 ! **G.C.:** Asientiem, W.P. (young fr. July) *Chipp* 291 ! **S.Nig.:** *Kennedy* 1711 ! Atigere (Feb.) *Millen* 151 ! Eba Isl. (Mar.) *Ross* 98 ! **Br.Cam.:** Johann-Albrechtshöhe (Mar.) *Staudt* 740 ! Likomba (Dec.) *Mildbr.* 10795 ! Near Tiko (Jan.) *Box* 3554 ! Also in French Cameroons and Gabon.

4. **U. elliotianum** (*Engl. & Diels*) *Sprague & Hutch.* var. **elliotianum**—Kew Bull. 1916 : 159. *Uvaria elliotiana* Engl. & Diels Monogr. Afr. Annonac. 28 (1901). *Uvariopsis chevalieri* Robyns & Ghesq. in Ann. Soc. Sci. Brux. 53 : 318 (1933). Tree 15–20 ft. high, often in riverine forest, flowers white.
S.L.: Talla Hills (Feb.) *Sc. Elliot* 4855 ! Bandajuma (May) *Aylmer* 79 ! **G.C.:** Banks of R. Volta (Apr). *Vigne* 1689 ! Bonsa Su (May) *Vigne* 1977 ! Yabei (June) *Vigne* 3893 ! **N.Nig.:** Abinsi, in ravines (June) *Dalz.* 761 ! **S.Nig.:** Lagos *Rowland* ! *Foster* 9 ! Olokemeji (fr. July, Aug.) *Chev.* 13998 ! 14069 ! *Symington* FHI 5073 ! (See Appendix, p. 8.)

4a. **U. elliotianum** var. **sericeum** *Keay* in Kew Bull. 1952 : 151. Bush 15 ft. high, flowers white, fruiting carpels pear-shaped 1½ in. long, velutinous.
Fr.G.: Kindia (May) *Jac.-Fel.* 465 ! **S.L.:** Njala (fl. Feb., fr. July) *Deighton* 510 ! 3015 !

4b. **U. elliotianum** var. **glabrum** *Keay* l.c. (1952). Shrub or small tree to 20 ft., flowers white, in forest undergrowth.
Iv.C.: San Pedro *Thoiré* ! **G.C.:** Kwahu Prasu (Feb.) *Vigne* 1628 ! Atewa Range, E.P. (Feb.) *Vigne* 4336 ! S. Fomang Su F.R. (Jan.) *Vigne* 2679 !

15. HEXALOBUS A.DC.—F.T.A. 1 : 26.

Petals about 8 cm. long, silky outside, lanceolate ; leaves acutely acuminate at apex, obtuse or rounded at base, 12–20 cm. long, 4–7 cm. broad, glabrous and shining above, shortly pubescent or glabrescent beneath ; pedicels 1–1·5 cm. long ; sepals ovate, thick, at length reflexed, about 1·5 cm. long, silky-tomentose ; fruiting carpels subsessile, ferrugineous-tomentose, oblong, 8 cm. long, 4 cm. broad, woody.
1. *crispiflorus*

Petals under 3 cm. long ; leaves at most acute ; flowers subsessile :

Leaves more or less acute, distinctly pointed, pubescent beneath, oblong-lanceolate, rounded at base, up to 15 cm. long and 4·5 cm. broad ; lateral nerves prominent beneath ; young branchlets softly tomentellous ; fruiting carpels turgid, 4–5 cm. long, 2 cm. thick .. .. 2. *monopetalus* var. *monopetalus*

Leaves obtuse or rounded at apex, becoming almost glabrous beneath, narrowly oblong, rounded at base, generally smaller than above, lateral nerves rather faint beneath, young branches pubescent .. .. 2a. *monopetalus* var. *parvifolius*

1. **H. crispiflorus** *A. Rich.* in Sagra Fl. Cub. 1 : 43 (1845) ; Chev. Bot. 9 ; Aubrév. Fl. For. C. Iv. 1 : 104, t. 33. *H. grandiflorus* Benth.—F.T.A. 1 : 27. A forest tree, 60–80 ft. fluted at the base, with conspicuous, pale-yellow, fragrant flowers ; fruit red.
Fr.G.: *Farmar* 263 ! Mamou (Mar.) *Dalz.* 8391 ! And various localities *fide* Chev. *l.c.* **S.L.:** Likuru, Talla (Feb.) *Sc. Elliot* 4953 ! Sewa R., Simbuia (Feb.) *Lane-Poole* 167 ! Keyeima (fr. Mar.) *Deighton* 3140 ! **Iv.C.:** Morenou (Nov.) *Chev.* 22446 ! Adzope *Aubrév.* 1794 ! **G.C.:** Jimira F.R. (Oct.) *Vigne*, 3114 ! **Togo:** *Kersting* A. 594 ! **S.Nig.:** Lagos *Rowland* ! Abo (fr. Mar.) *Barter* ! Calabar (fl. Mar.

fr. Aug.) *Thomson* 41 ! Oban *Talbot* 1245*a* ! **Br.Cam.:** Ambas Bay *Mann* 709 ! Missellele, Tiko (Jan.) *Box* 3571 ! Likomba (Nov.) *Mildbr.* 10611. Extends to A.-E. Sudan and Belgian Congo. (See Appendix, p. 4.)

2. **H. monopetalus** (*A. Rich.*) *Engl. & Diels* var. **monopetalus**—Monogr. Afr. Annonac. 56 (1901) ; Aubrév. Fl. Soud.-Guin. 38. *Uvaria monopetala* A. Rich. in Guill. & Perr. Fl. Seneg. 8, t. 2 (1831). *H. senegalensis* A.DC.—F.T.A. 1 : 27. *H. tomentosa* A. Chev. Bot. 9, name only. A small tree of savannah, larger in fringing forest ; petals cream.
Sen.: *Perrottet* 8 ! *Heudelot* 360 ! Galam *Perrottet* ! **Gam.:** *Dawe* 51 ! Genieri (Feb.) *Fox* 37 ! **Fr.Sud., Fr.G.,** and **Iv.C.:** various localities *fide* Aubrév. *l.c.* **G.C.:** Prang to Attabubu *Kitson* 965 ! Gambaga (June) *Vigne* 3868 ! Naga (Apr.) *Vigne* 4732 ! **Dah.:** Atacora Mts. (June) *Chev.* 24159 ! **N.Nig.:** Nupe *Barter* 938 ! Patti Lokoja (Nov.) *Dalz.* 206 ! *Keay* FHI 28093 ! Extends to E. Sudan and Uganda. (See Appendix, p. 5.)

2a. **H. monopetalus** var. **parvifolius** *Bak. f.* in Cat. Talb. 5 (1913). *H. glabrescens* Hutch. & Dalz. in Kew Bull. 1927 : 152 ; F.W.T.A., ed. 1, 1 : 52. A small tree or shrub of savannah ; flowers yellow ; fruiting carpels irregularly ovoid, or cylindrical, orange yellow.
G.C.: Pabarabo Hill (fr. May) *Kitson* 1110 ! Aframso (Oct.) *Vigne* 4030 ! **N.Nig.:** Lere to Ham *Talbot* 531 ! Yola (Oct.) *Shaw* 103 ! Song (fr. May) *Rosevear* FHI 26603 ! Extends to east and south tropical Africa.

16. MONOCYCLANTHUS Keay in Kew Bull. 1953 : 69.

Branchlets and leaves glabrous ; leaves oblong-elliptic, cuneate at base, gradually acuminate, 13–25 cm. long, 5–7·5 cm. broad, with a swollen sulcate petiole, 5–7 mm. long, lamina minutely and densely gland-dotted ; inflorescence on stem and older branches, fasciculate, few-flowered ; petals 6, valvate in a single whorl, triangular-lanceolate, 14–16 mm. long, up to 4–6 mm. broad, exposed in bud ; receptacle ellipsoid with very numerous linear stamens ; carpels free, about 7, densely pilose ; fruits not known .. .. *vignei*

M. vignei *Keay* in Kew Bull. 1953 : 69. A forest tree, to 20 ft. high ; cauliflorous ; petals yellow.
G.C.: Benso (Sept.) *Vigne* 4744 ! Ankasa F.R. (Dec.) *Vigne* 3175 !

17. ENNEASTEMON Exell [1] in J. Bot. 70 Suppl. 1 : 209 (1932). *Clathrospermum* Planch. ex Benth. & Hook. f. Gen. Pl. 1 : 29 (1862).

Flowers solitary or paired :

Flower-buds ovoid just before opening ; pedicels, sepals and petals puberulous outside ; leaves without marginal glands at the base :

Leaves oblong-obovate, rounded to subcordate at the broad base, 8–15 cm. long, 3·5–6·5 cm. broad ; lateral nerves 6–10 pairs ; fruiting carpels 1- (rarely 2-) seeded, puberulous, cylindrical, about 1 cm. long and 4 mm. diam. .. .. 1. *vogelii*

Leaves oblanceolate, rounded at the narrow base, 6–14 cm. long, 2–4·5 cm. broad ; lateral nerves 5–7 pairs ; fruits not known .. .. .. 2. *angustifolius*

Flower-buds depressed-subglobose before opening ; pedicels, sepals and petals densely rusty tomentellous outside ; leaves with a pair of marginal glands at the base ; fruiting carpels, 2–4-seeded, brown tomentose :

Fruiting carpels verrucose, not torulose, 1–3·2 cm. long, 7–8 mm. diam. ; leaves oblong-elliptic to obovate-elliptic, 8–17 cm. long, 3·5–7·5 cm. broad .. 3. *capea*

Fruiting carpels smooth, torulose, 2–4·5 cm. long, 6–8 mm. broad ; leaves oblong-elliptic to obovate-elliptic, 4·5–14 cm. long, 1·5–4·5 cm. broad .. 4. *barteri*

Flowers in cymes of more than 2 flowers ; flower-buds depressed-subglobose ; pedicels, sepals and petals densely rusty tomentellous outside ; leaves without marginal glands at the base :

Flowers in numerous, lax, branched, 4–12-flowered cymes, often crowded towards the ends of the branches above the leaves ; pedicels more than 5 mm. long ; flowers more than 5 mm. diam. ; leaves oblong-elliptic, 8–18 cm. long, 3·5–7·5 cm. broad, densely brown silky pilose beneath when young .. .. .. 5. *foliosus*

Flowers in 3–6-flowered, axillary, fasciculate cymes ; pedicels less than 5 mm. ; flowers less than 5 mm. diam. ; leaves oblong-elliptic, 3·5–11 cm. long, 1·5–4·5 cm. broad, sparingly puberulous beneath when young, becoming markedly glaucous beneath .. .. 6. *mannii*

1. **E. vogelii** (*Hook. f.*) *Keay* in Kew Bull. 1953 : 72. *Uvaria ? vogelii* Hook. f. in Fl. Nigrit. 208, t. 17 (1849). *Clathrospermum vogelii* (Hook. f.) Planch.—F.T.A. 1 : 25, partly (*T. Vogel* 203). *Popowia vogelii* (Hook. f.) Baill.—Engl. & Diels Monogr. Afr. Annonac. 50, partly; F.W.T.A., ed. 1, 1 : 55, partly (*T. Vogel* 203). *Popowia dalzielii* Hutch. in F.W.T.A., ed. 1, 1 : 55 ; Kew Bull. 1927 : 152. *Popowia barteri* of F.W.T.A., ed. 1, 1 : 55, partly (*Barter* 1221). Scrambling shrub or small tree ; flowers orange ; usually by streams.
G.C.: R. Volta, Kpong (Apr.) *Irvine* 2887 ! **Togo :** Kete Krachi (June) *Vigne* 3884 ! **N.Nig.:** Nupe *Barter* 1221 ! Lokoja *Barter* ! R. Niger, Stirling (fr. Sept.) *T. Vogel* 203 ! Abinsi (July) *Dalz.* 712 ! **S.Nig.:** Olokemeji *Foster* 312 ! *Jones & Keay* FHI 14604 ! Shasha F.R. (fl. Apr.) *Ross* 232 !

2. **E. angustifolius** *Exell* in J. Bot. 75 : 163 (1937). Shrub to 5 ft. high ; in rocks by streams.
S.Nig.: R. Oni, Ajebandele (May) *Richards* 3469 ! Owo F.R. (May) *Jones* FHI 3608 ! **Br.Cam.:** Abonando, Mamfe (May) *Rudatis* 54 !

3. **E. capea** (*E. G. & A. Camus*) *Ghesq.* in Rev. Zool. & Bot. Afr. 32 : 141 (1939). *Popowia capea* E. G. & A. Camus in Bull. Maison Roure-Bertrand Fils, Sér. 3, 8 : 43, t. 1–5 (1911) ; Aubrév. Fl. For. C. Iv. 1 : 96. Liane, leaves glaucous beneath, scented.
Iv.C.: Attié *Camus* ! Agboville (fr. Aug.) *Aubrév.* 1496 !

4. **E. barteri** (*Baill.*) *Keay* l.c. 72 (1953). *Popowia barteri* Baill. in Adansonia 8 : 324 (1868) ; Engl. & Diels l.c. 51, t. 21 ; F.W.T.A., ed. 1, 1 : 55, partly (excl. *Barter* 1221). *P. heudelotii* Baill. l.c. 321 (1868) ; Engl. & Diels l.c. 51, partly (excl. *Barter* ex Onitsha). *Clathrospermum heudelotii* (Baill.) Sc. Elliot in J. Linn. Soc. 33 : 71 (1894), partly. *Popowia nigritiana* Bak. f. in Cat. Talb. 4 (1913) ; F.W.T.A., ed. 1,

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[1] This name has been proposed for conservation.

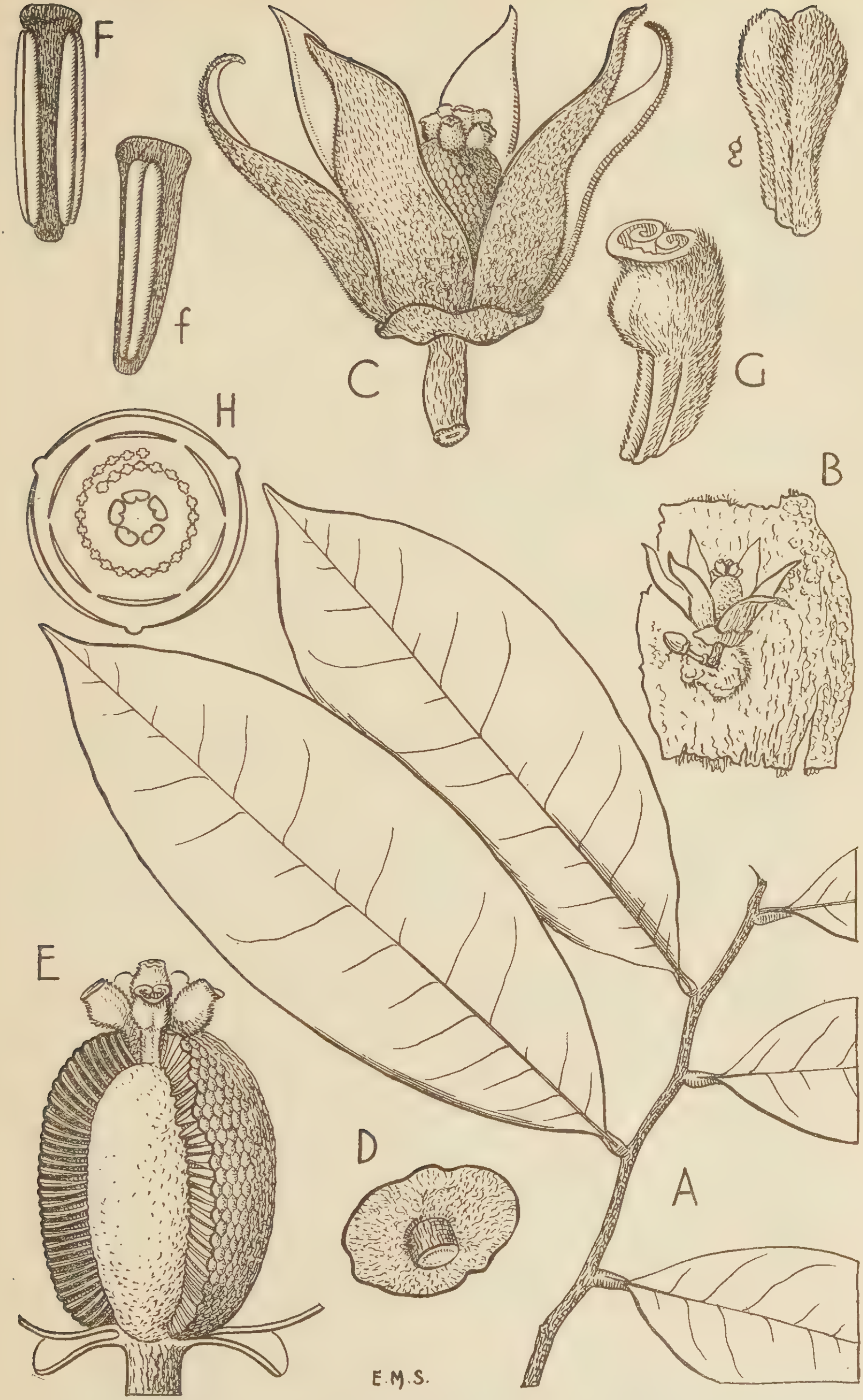

Fig. 11.—Monocyclanthus vignei *Keay* (Annonaceae).

A, leafy shoot, × ½. B, inflorescence, × 1. C, flower, × 3. D, calyx, × 4. E, dissected flower, with some of the stamens removed to show the receptacle, × 5. F & f, stamen, × 20. G & g, carpel, × 10. H, floral diagram.
Drawn from *Vigne* FH 4744.

1 : 55. *Enneastemon nigritianus* (Bak. f.) Exell in J. Bot. 72 : 28 (1934). Shrub, to 6 ft. high ; flowers yellow ; fruits red.
Port.G.: Formosa, Amedi (Apr.) *Esp. Santo* 1953 ! **Fr.G.:** *Farmar* 192 ! Karkandy (fl. & fr. Apr.) *Heudelot* 878 ! Kindia (fr. Sept.) *Pobéguin* 1291 ! Kouria (Apr.) *Pobéguin* 1550 ! Boulléré (fr. Jan.) *Chillou* ! **S.L.:** (May) *Barter* ! Kambia (fr. Jan.) *Sc. Elliot* 4671 ! Madina, Limba (Apr.) *Sc. Elliot* 5656 ! **S.Nig.:** Oban *Talbot* 1550 ! Also in Ubangi.

5. **E. foliosus** (*Engl. & Diels*) *Robyns & Ghesq.* in Ann. Soc. Sci. Brux. Sér. B., 53 : 165 (1933). *Popowia foliosa* Engl. & Diels l.c. 52 (1901). A woody climber in secondary forest and forest margins ; petals cream, sepals pale brown.
G.C.: Anwhiaso F.R. (Sept.) *Foggie* FH 4437 ! Sefwi Bekwai, W. Prov. *Akpabla* 906 ! **S.Nig.:** Okomu F.R. (Jan., Feb.) *Brenan* 8826 ! 8917 ! 9125 ! **Br.Cam.:** Mapanya, Cam. Mt., 2,400 ft. (Apr.) *Maitland* 1072 ! Also in French Cameroons.

6. **E. mannii** (*Baill.*) *Keay* l.c. 72 (1953). *Popowia mannii* Baill. l.c. 320 (1868) ; F.W.T.A., ed. 1, 1 : 55. *Clathrospermum baillonii* Sc. Elliot l.c. 70 (1894). *Popowia baillonii* (Sc. Elliot) Engl. & Diels l.c. 48. *P. vogelii* of Engl. & Diels l.c. 50, partly, not of Planch. A scrambling shrub with silvery leaves and very small flowers.
S.L.: Bagroo R. *Mann* 809 ! Berria (Mar.) *Sc. Elliot* 5415 ! Karene (fr. Dec.) *Sc. Elliot* 4020 ! Yonibana (fr. Oct.) *Thomas* 4200 ! Ronietta (fr. Nov.) *Thomas* 5538 !

18. **UVARIOPSIS** Engl. & Diels—Robyns & Ghesq. in Ann. Soc. Sci. Brux. 53 : 312 (1933).

Flower buds elongate, tetragonal in section ; petals 1·5–3 cm. long, linear-lanceolate, strigose pubescent outside ; flowers solitary or in few-flowered fascicles on the bole ; leaves elongate or oblanceolate, rounded and slightly subcordate at base, rather long-acuminate, 15–20 cm. long, 4–9 cm. broad, glabrous except for the midrib beneath, laxly reticulate ; fruiting carpels lobulate, 5·5 cm. long, 2 cm. broad 1. *bakeriana*
Flower buds globose or ovoid-conical ; petals suborbicular to ovate :
  Flowers solitary, or up to 3 together, axillary on leafy shoots ; buds globose ; petals suborbicular, 9–12 mm. diam. ; fruiting carpels shortly stipitate, subcylindrical to obovoid, 2–4 cm. long, 1·2–1·7 cm. broad, constricted between the seeds ; leaves oblong to oblong-oblanceolate, rounded or obtuse at base, gradually acuminate, 12–23 cm. long, 3·5–8·5 cm. broad, with 9–14 pairs of looping lateral nerves 2. *globiflora*
  Flowers in fascicles on the bole :
    Flower buds depressed globose ; petals of male flower ovate-triangular, 18–20 mm. long, 14–17 mm. broad, very fleshy and up to 6 mm. thick, connate for 5–7 mm. at base ; female flowers not known ; fruiting carpels sessile, up to 4·5 cm. long, constricted between the seeds, fruiting pedicels up to 6·5 cm. long ; leaves very similar to above, 15–25 cm. long, 5–9 cm. broad, with about 10 pairs of lateral nerves looped well within the margin .. .. 3. *guineensis*
    Flower buds ovoid-conical ; petals ovate, female up to 25 mm. long and 15 mm. broad, male 8–13 mm. long, 5–7 mm. broad, up to 2 mm. thick ; pedicels variable in length, up to 18 cm. long in female flower ; fruiting carpels almost sessile, subglobose to cylindrical, about 5 cm. long and 3 cm. broad, not constricted between the seeds ; leaves oblong, obovate or oblanceolate, 12–20 cm. long, 4–8 cm. broad, very similar to above .. .. 4. *dioica*

1. **U. bakeriana** (*Hutch. & Dalz.*) *Robyns & Ghesq.* in Ann. Soc. Sci. Brux. 53 : 9 (1933) ; Keay in Kew Bull. 1952 : 153. *Tetrastemma bakerianum* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 57 (1927) ; Kew Bull. 1927 : 153. Shrub or small tree to 20 ft., in marshy forest ; petals pinkish-brown outside, carmine within. Monoecious, female flowers with about 12 carpels, male flowers with numerous whitish stamens, fruiting carpels bright red.
S.Nig.: Mbarakpa-Obutong Road, Oban (Dec.) *Talbot* 1517 ! Between Obutong and Mfamoseng (fr. Mar.) *McElderry* FHI 7737 ! **Br.Cam.:** S. Bakundu F.R. (fl. & fr. Mar.) *Brenan* 9305 ! 9409 ! Also in French Cameroons.

2. **U. globiflora** *Keay* in Kew Bull. 1952 : 152. Forest tree, to 20 ft. high, petals yellow.
G.C.: Amentia (Mar.) *Vigne* 1877 ! Bobiri F.R. (fr. Jan.) *Andoh* FH 5096 ! S. Fomang Su F.R. (Oct.) *Andoh* FH 4246 !

3. **U. guineensis** *Keay* l.c. (1952). *Uvaria spectabilis* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 50 (1927); Chev. Bot. 7 ; not of DC. (1818). Forest tree to 35 ft. high ; cauliflorous, flowers very fragrant, petals green outside, yellowish within ; fruits red.
Fr.G.: Fassakoidou *Chev.* 20797 ! **S.L.:** Gola Forest (fr. Jan.) *Unwin & Smythe* 51 ! Kenema (May) *Small* 101 ! **Lib.:** Gbanga (Sept.) *Linder* 580 ! **Iv.C.:** Dyolas (fr. Apr.) *Chev.* 21305 !

4. **U. dioica** (*Diels*) *Robyns & Ghesq.* l.c. 321 (1933) ; Keay l.c. 154. *Tetrastemma dioicum* Diels in Engl. Bot. Jahrb. 38 : 241 (1906) and 39 : 475, t. 1 (1907). *Uvariopsis pedunculosa* (Diels) Robyns & Ghesq. l.c. *Tetrastemma pedunculosa* Diels l.c. 53 : 441 (1915). Tree of dense forest, to 25 ft. high ; cauliflorous, flowers very dense at ground level, sparse higher up ; pedicel, calyx and petals outside crimson ; inside of petals and anthers pale yellow ; fruiting carpels crimson ; monoecious (or dioecious ?).
S.Nig.: Sapoba F.R. (fl. Oct., Nov., & fr. Nov.) *A. F. Ross* 216 ! *Keay* FHI 28066 ! *Kennedy* 2573 ! **Br.Cam.:** Bibundi (Nov.) *Mildbr.* 10647 ! Also in French Cameroons.

19. **DENNETTIA** Bak. f. in Cat. Talb. 5, t. 2 (1913).

Medium-sized tree ; branchlets glabrous ; leaves oblong or oblong-elliptic, very shortly cuneate at base, obtusely acuminate, 10–15 cm. long, 4–6 cm. broad, laxly reticulate ; lateral nerves about 10 pairs, much branched towards margin ; flowers few on short pustular branchlets ; pedicels about 1 cm. long, tomentellous ; sepals very broad, 3 mm. long, appressed-pubescent ; petals ovate, 1 cm. long, shortly pubescent *tripetala*

D. tripetala *Bak. f.* in Cat. Talb. 5, t. 2 (1913). Forest tree, to 50 ft. high.
S.Nig.: Olokemeji *Unwin* 12! Owena, Ondo Prov. (Feb.) *Darko* 186! Benin City (Jan.) *Dennett* 44! Oban *Talbot* 1496! **Br.Cam.:** Bonjongo, 2,000 ft. (Apr.) *Maitland* 626! Missellele, Tiko (Jan.) *Box* 3556! (See Appendix, p. 4.)

20. ENANTIA Oliv.—F.T.A. 1 : 17 ; Robyns & Ghesq. in Bull. Jard. Bot. Brux. 9 : 303 (1933).

Undersurface of leaves with simple or paired hairs, without stellate hairs ; fruiting stipes relatively short, 7–18 mm. long ; monocarps up to about 20 ; leaves oblong-oblanceolate, base obtuse, apex acuminate, 8–25 cm. long, 3–9 cm. broad ; petals about 25 mm. long and 12 mm. broad .. .. 1. *chlorantha*

Undersurface of leaves with stellate as well as simple hairs ; fruiting stipes 15–40 mm. long ; monocarps 30 or more ; otherwise as above .. .. .. 2. *polycarpa*

1. **E. chlorantha** *Oliv.*—F.T.A. 1 : 18 ; Chev. Bot. 13 ; Robyns & Ghesq. l.c. 308 (excl. spec. ex Liberia). Forest tree, to 90 ft. high and 3 ft. girth, wood bright yellow ; fruiting carpels black, fleshy, on reddish stipes.
S.Nig.: Owo F.R. *Jones* FHI 3483! Okomu F.R. (fl. & fr. Dec.) *Brenan & Richards* 8610! Sapoba (May) *Kennedy* 832! Old Calabar *Thomson* 130! Aboabam, Ikom (fl. & fr. May) *Jones* FHI 18706! **Br.Cam.:** Bambuko (fr. Sept.) *Olorunfemi* FHI 30760! **F.Po:** Bokoko *Mildbr.* 6896. Also in French Cameroons. (See Appendix, p. 4.)

2. **E. polycarpa** (*DC.*) *Engl. & Diels* Monogr. Afr. Annonac. 69 (1901). *Unona ? polycarpa* DC. (1817). *Xylopia polycarpa* (DC.) Oliv. F.T.A. 1 : 32. *E. chlorantha* of Cooper & Record in Yale Univ. For. Bull. 31 : 14 (1931), not of Oliv. Forest tree to 60 ft. high ; like the preceding.
S.L.: *Afzelius*! Sugar Loaf Mt. 1,800–2,000 ft. *Daniell*! Kambui Hills (Nov.) *Edwardson* 192! **Lib.:** Dukwia R. (fr. Feb.) *Cooper* 146! 268! **Iv.C.:** Bouroukrou (fr. Jan.) *Chev.* 16111! Abidjan (Oct.) *Aubrév.* 125! **G.C.:** E. Akim (fr. June) *Johnson* 740! Mampong Scarp, 1,400 ft. (fr. May) *Vigne* 1726! Jimira F.R. (fr. Nov.) *Vigne* 4086! **S.Nig.:** Benin City (fr. July) *Unwin* 111! Ibadan F.R. (Apr.) FHI 22854! (See Appendix, p. 4.)

21. ANONIDIUM Engl. & Diels in Notizbl. Bot. Gart. Berl. 3 : 56 (1900).

Sepals acutely triangular-ovate, up to 1·8 cm. broad and 3 cm. long ; outer petals lanceolate, broadest towards the base, up to 4·5 cm. long and 2 cm. broad ; inner petals similar in shape but a little smaller ; leaves oblong-oblanceolate, apex long-acuminate, base auriculate, up to 50 cm. long and 14 cm. broad, longer in proportion to breadth than in the next species ; inflorescences borne on large leafless branches beneath the foliage .. .. 1. *friesianum*

Sepals broadly triangular, obtuse at apex, up to 3 cm. broad and long ; outer petals elliptic, broadest at or above the middle, up to 7 cm. long and 3·5 cm. broad ; inner petals similar in shape but considerably smaller ; leaves similar to above but relatively shorter and broader, up to 35 cm. long and 17 cm. broad ; inflorescences as above 2. *mannii*

1. **A. friesianum** *Exell* in J. Bot. 70, Suppl. 1 : 211 (1932). Forest tree to 60 ft. high ; like the next.
Br.Cam.: Kumba, S. Bakundu F.R. (Mar., Apr.) *Brenan* 9410! *Olorunfemi* FHI 30508! Also in Cabinda.

2. **A. mannii** (*Oliv.*) *Engl. & Diels* Monogr. Afr. Annonac. 37 (1901). *Annona mannii* Oliv.—F.T.A. 1 : 17. Tree 20–60 ft. high, wide-spreading crown of dense foliage. Flowers pale green, borne on leafless branches ; fruit up to 30 cm. long.
G.C.: Abofaw (June) *Vigne* 1191! Bobiri F.R. (Jan.) *Andoh* FH 5091! **S.Nig.:** Okomu F.R. (Dec.) *Brenan* 8450! Sapoba *Kennedy* 2087! Old Calabar (Feb.) *Mann* 2231! Oban *Talbot* 1477! **Br.Cam.:** Johann-Albrechtshöhe (Jan.) *Staudt* 813! Also in French Cameroons, Gabon and Congo. (See Appendix, p. 3.)

22. ANNONA Linn.—F.T.A. 1 : 14 ; Robyns & Ghesq. Essai de Révision des Espèces africaines du Genre *Annona* L. (1934).

*Inner petals definitely smaller than the outer petals ; leaves rounded or obtuse at apex :

Leaves and branchlets quite glabrous even when young ; petiole less than 5 mm. long ; leaves oblong, elliptic or more or less obovate-lanceolate, 8–15 cm. long, 2·5–5·5 cm. broad, cuneate and slightly decurrent at base ; sepals and petals glabrous, outer petals about 2 cm. long .. .. 1. *glauca* var. *glauca*

Leaves and branchlets pubescent or tomentose, often densely so when young :

Petiole less than 5 mm. long, or leaves sessile ; leaves suborbicular or broadly obovate, 5·5–8·5 cm. long and about 4 cm. broad ; branchlets and underside of leaves shortly appressed pubescent ; sepals and petals glabrous outside, outer petals 2 cm. long .. .. 1a. *glauca* var. *minor*

Petiole more than 5 mm. long ; sepals and petals pubescent outside, outer petals up to 1·5 cm. long :

Lower surface of adult leaves very shortly tomentose with curly hairs ; leaves broadly ovate-elliptic, subcordate to broadly cuneate at base, 9·5–20 cm. long, 6–12·5 cm. broad ; sepals and petals tomentose outside, outer petals up to 1·5 cm. long .. .. 2. *arenaria*

Lower surface of adult leaves sparsely or densely pubescent with relatively long hairs, becoming less hairy and glaucous with age ; leaves 5–13 cm. long, 3–8·5 cm. broad, with parallel lateral nerves prominent beneath ; sepals and petals pubescent outside, outer petals up to 1·2 cm. long :

Leaves broadly ovate to ovate-elliptic, subcordate or rounded at base densely pubescent when young .. .. .. 3. *senegalensis* var. *senegalensis*

Leaves elliptic to oblong-elliptic, obtuse or broadly deltoid at base, rather sparsely pubescent even when young .. .. 3a. *senegalensis* var. *deltoides*

*Inner petals of about the same size as the outer petals ; leaves acuminate, oblong-elliptic, 5–12 cm. long, 3·5–5·5 cm. broad, obtuse at base, glabrous, main nerves and venation prominent on both surfaces ; sepals and petals glabrous outside, outer petals 1·5–2 cm. long .. .. 4. *glabra*

1. **A. glauca** *Schum. & Thonn.* var. **glauca**—Beskr. Guin. Pl. 259 (1827) ; F.T.A. 1 : 17 ; Engl. & Diels Monogr. Afr. Annonac. 80. A shrub, up to 5 ft. high.
G.C.: *Thonning.* Cape Coast *Brass* ! Prampram (May) *Irvine* 1431 ! Puru R., Prang (Apr.) *Kitson* 500 ! 904 ! Wale-Wale, N.T. *Armitage* H 3247 ! (See Appendix, p. 1.)

1a. **A. glauca** var. **minor** *Robyns & Ghesq.* Essai de Révision des Espèces africaines du Genre *Annona*, 22 (1934). Shrub like the last but with broader leaves and appressed pubescent young shoots.
Sen.: various localities *fide* Robyns & Ghesq. *l.c.* Also (determined from description) : Dakar, near airport (May) *Baldwin* 5737 !

2. **A. arenaria** *Thonn.* in Schum. Beskr. Guin. Pl. 257 (1827) ; including var. *obtusa* Robyns & Ghesq. l.c. 22–28. A small tree, up to 25 ft. high.
Fr.G.: *Farmar* 307 ! **S.L.:** *Afzelius* ! *Don* ! Talla Hills (Feb.) *Sc. Elliot* 4891 ! Near Berria, Tambakka *Sc. Elliot* 4960*b* ! Waterloo (fr. May) *Deighton* 2655 ! Tepetuk (Apr.) *Jordan* 220 ! **Iv.C.:** *fide* Robyns & Ghesq. *l.c.* Also in French Cameroons and extending to Belgian Congo and Angola.

3. **A. senegalensis** *Pers.* var. **senegalensis**—Syn. Pl. 2 : 95 (1806) ; Robyns & Ghesq. l.c. 35. Shrub or small tree in savannah. Fruit edible, smooth yellow when ripe, showing outline of carpels by coloured reticulation on the surface.
Sen.: various localities *fide* Robyns & Ghesq. *l.c.* **Gam.:** north bank of R. Gambia *Ozanne* 13 ! Foal (Mar.) *Perrottet* 4 ! **G.C.:** Bawku, N.T. (Apr.) *Vigne* 3747 ! **Togo:** Misahöhe (Nov.) *Mildbr.* 7339. **N.Nig.:** Nupe *Barter* 1168 ! Katagum *Dalz.* 82 ! Zurmi (Apr.) *Keay* FHI 15639 ! Bauchi Plateau (Mar.) *Lely* 10 ! Also in A.-E. Sudan, and in Cape Verde islands. (See Appendix, p. 1.)

3a. **A. senegalensis** var. **deltoides** *Robyns & Ghesq.* l.c. 37 (1934). Similar to above, apparently more abundant.
Sen.: various localities *fide* Robyns & Ghesq. *l.c.* **Fr.G.:** Rio Nunez *Heudelot* 781 ! **Fr.Sud.:** Kankan (Mar.) *Chev.* 575 ! **S.L.:** near Berria, Tambakka *Sc. Elliot* 4960*a* ! **Iv.C.:** *Aubrév.* 742 ! **G.C.:** Achimota (Feb.) *Irvine* 149 ! Jagalo to Tuli (Mar.) *Kitson* 711 ! Pan to Bujan (Apr.) *Kitson* 501 ! Tamale (young fr. Apr.) *Williams* 149 ! **Togo:** Misahöhe (Mar.) *Baumann* 146. Sokode-Basari (fr. Feb.) *Kersting* 544. **Dah.:** Cotonou *Debeaux* 336 ! **N.Nig.:** Katagum *Dalz.* 82 *bis* ! Bauchi Plateau (Mar.) *Lely* P. 196 ! Bornu (May) *E. Vogel* 70 ! **S.Nig.:** Lagos (Mar.) *Rowland* ! *Foster* 30 ! Onitsha Dist. *Rosevear* 14/29 ! Also in Ubangi-Shari.

4. **A. glabra** *Linn.* Sp. Pl. 537 (1753) ; Robyns & Ghesq. l.c. 49. *A. palustris* Linn. (1762)—F.T.A. 1 : 16 ; F.W.T.A., ed. 1, 1 : 57. A small tree or shrub of coastal marshes ; flower white ; fruits smooth, yellowish when ripe.
Sen.: Cayor *Perrottet.* **Gam.:** Albreda *Perrottet* 5 ! **S.L.:** Bawbaw (May) *Deighton* 2740 ! Luti (young fr. July) *Jordan* 279 ! **Lib.:** Grand Bassa (July) *T. Vogel* 100 ! **Iv.C.:** mouth of R. Cavally (Aug.) *Chev.* 19907. **S.Nig.:** Lagos (Feb.-Apr.) *Dalz.* 1097 ! Also in French Cameroons, S. Tomé, Congo and in tropical America.

Robyns & Ghesquiere (l.c.) also record from our area *A. chrysophylla* Boj. on a single specimen (*Lely* P. 391*b* from the Bauchi Plateau). This species is widespread in tropical Africa east of the Cameroons, but I am not sufficiently convinced of the identity of *Lely* P. 391*b* to include *A. chrysophylla* Boj. in our key. This species is close to *A. senegalensis* Pers. var. *senegalensis* but, according to Robyns & Ghesquiere, differs in its thicker and rather larger leaves, irregularly spaced curved lateral nerves and ferruginous indumentum.—R. W. J. K.

Several species have been introduced and are cultivated for their fruit ; they may be naturalized in places. Introduced species include : *A. muricata* Linn., the sour-sop ; *A. reticulata* Linn., the custard apple, or bullock's heart ; *A. squamosa* Linn., the sweet-sop ; *A. cherimola* Mill., the cherimola.

23. ISOLONA Engl.—Engl. & Diels Monogr. Afr. Annonac. 82 (1901).

Young shoots and leaves glabrous :
  Corolla lobes up to 10 mm. long, less than twice as long as the tube :
    Corolla lobes narrowly triangular, up to 3·5 mm. broad at base, acute or obtuse at apex, 7–10 mm. long ; tube expanded at base, about 4–5 mm. long ; leaves oblong or oblong-lanceolate, obtusely long-acuminate, narrowly cuneate at base, 8–15 cm. long, 2–5 cm. broad, with 8–10 pairs of lateral nerves prominent beneath and markedly looped about 5 mm. from the margin ; fruit narrowly ovoid, lobulate, not ridged, 4–5 cm. long, 2–3 cm. broad .. .. 1. *campanulata*
    Corolla lobes oblong, 3–5 mm. broad at base, rounded at apex, 5–10 mm. long ; tube expanded at base, about 10 mm. long ; leaves oblong-oblanceolate gradually acuminate, broadly cuneate to obtuse at base, 8–15 cm. long, 2–4·5 cm. broad, with 9–13 pairs of lateral nerves prominent above and beneath, extending almost to the margin without looping ; fruit subovoid to depressed subglobose, lobulate, with irregular transverse ridges, 8–10 cm. long, 7–8 cm. broad
2. *pleurocarpa* subsp. *nigerica*
  Corolla lobes 12–25 mm. long, more than twice as long as the tube :
    Corolla lobes oblong, 3·5–4·5 mm. broad, tube 5–7 mm. long ; leaves oblong-obovate, 20–27 cm. long, 7–10 cm. broad, obtuse to rounded at base, acuminate, with 9–12 pairs of lateral nerves prominent beneath.. .. .. .. 3. *cooperi*
    Corolla lobes lanceolate, acute, up to 3·5 mm. broad, tube 3–5 mm. long ; leaves oblong-elliptic, 8–25 cm. long, 2·5–8·5 cm. broad, obtuse to cuneate at base, rather abruptly acuminate, with 10–13 pairs of lateral nerves .. .. 4. *thonneri*
Young shoots and leaves pubescent or densely hirsute :
  Leaves beneath, especially the midrib and nerves, and the shoots densely hirsute to maturity ; leaves 12–18 cm. long and 3·5–6 cm. broad, elongate obovate to lanceolate, with 8–10 pairs of lateral nerves, base cuneate, apex long-acuminate ; lower part of corolla tube 5 mm. long, upper expanded part 7 mm. long ; lobes 13 mm. long triangular, spreading ; sepals 14 mm. long by 9 mm. broad ; fruit flattened, ellipsoid, 6 cm. long, 4 cm. broad and 1·8 cm. thick .. .. 5. *deightonii*

Leaves and shoots finely pubescent when young, only very sparsely so when mature; leaves 13–19 cm. long and 3·5–5 cm. broad, with 13–18 pairs of lateral nerves, cuneate at base, gradually long-acuminate ; lower part of corolla tube 4 mm. long, upper expanded part 5 mm. long ; lobes about 13 mm. long, triangular ; sepals 2 mm. long 6. *maitlandii*

1. I. **campanulata** *Engl. & Diels* in Monogr. Afr. Annonac. 83 (1901) ; Aubrév. Fl. For. C. Iv. 1 : 22, t. 41, 6–9. *I. leonensis* Sprague & Hutch. in Kew Bull. 1916 : 151 ; F.W.T.A., ed. 1, 1 : 58. *I. soubreana* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 58. Forest tree, 12–50 ft. high ; corolla green, turning yellow ; fruit yellow when ripe.
S.L.: Sendugu (June) *Thomas* 687 ! Yonibana (fl. & fr. Oct.) *Thomas* 4230 ! 4259 ! 4690 ! Mamaha (fl. & fr. Nov.) *Thomas* 4593 ! 4648 ! Kongohun (Apr.) *Deighton* 3676 ! Jau (fr. Oct.) *Deighton* 5238 ! **Iv.C.:** San Pedro *Thoiré* ! Soubré (June) *Chev.* 19088 ! 19138 ! Rasso (fl. & fr. Dec.) *Aubrév.* 570 ! **G.C.:** Bonsa-Ben F.R. (Dec.) *Vigne* 4753 ! Subiri F.R. (Feb.) *Vigne* 4757 ! **S.Nig.:** Oban *Talbot* 3261 ! Also in French Cameroons and Gabon. (See Appendix, p. 5.)

2. I. **pleurocarpa** *Diels* in Engl. Bot. Jahrb. 39 : 485 (1907) subsp. **nigerica** *Keay* in Kew Bull. 1952 : 157. *I. leonensis* of Kennedy For. Fl. S.Nig. 14, not of Sprague & Hutch. Forest tree, to 60 ft. high ; corolla green with carmine centre ; fruit dark brown.
S.Nig.: Sapoba (Sept.) *Kennedy* 1568 ! Shasha F.R. (Apr.) *Richards* 3343 ! The typical plant, which has longer corolla lobes, occurs in French Cameroons.

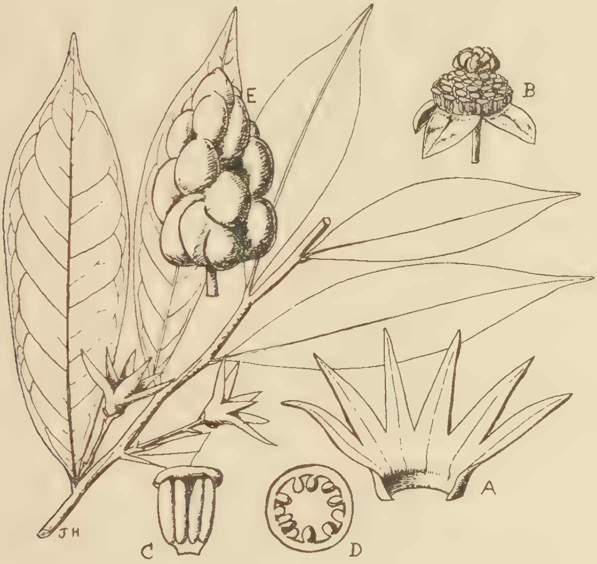

Fig. 12.—Isolona campanulata *Engl. & Diels* (Annonaceae).

A, corolla laid open.
B, calyx, stamens and pistil.
C, stamen.
D, ovary in cross-section.
E, fruit.

3. I. **cooperi** *Hutch. & Dalz. ex Cooper & Record* in Yale Univ. For. Bull. 31 : 15 (1931). Tree or shrub to 12 ft. high. in forest ; corolla yellow.
Lib.: Dukwia R. (May) *Cooper* 417 ! **G.C.:** Sefwi-Bekwai (Aug.) *Vigne* 1337 ! [Possibly not distinct from *I. zenkeri* Engl.]

4. I. **thonneri** (*De Wild. & Th. Dur.*) *Engl. & Diels* l.c. 83 (1901). *Monodora thonneri* De Wild. & Th. Dur. (1899). Tree to 35 ft. high, in forest ; corolla green at first, then yellow.
S.Nig.: Ohosu F.R. (Dec.) *Hide* 1/38 ! Also in Belgian Congo. [*Ejiofor* FHI 29302 from Kumba, British Cameroons, is very close to this species, but has narrower corolla lobes and longer sepals. The specimen recorded by Aubréville (l.c. 1 : 122) is inadequate for certain identification but does not appear to be this species.]

5. I. **deightonii** *Keay* in Kew Bull. 1952 : 156. Tree 15 ft. high, in forest ; flowers green, fruit yellowish, edible.
S.L.: Jama (fr. Sept.) *Deighton* 3072 ! Kongohun (Apr.) *Deighton* 3675 ! Daru, Tunkia (Mar.) *Deighton* 4112 !

6. I. **maitlandii** *Keay* l.c. 155 (1952). A forest tree.
Br.Cam.: Ngong, Bamenda, 3,000 ft. (June) *Maitland* 1555 ! Wae, Bamenda, 3,500 ft. (Apr.) *Maitland* 1596 !

24. MONODORA Dunal—F.T.A. 1 : 37.

Inner petals as long as or longer than the outer crispate petals, shortly clawed, broadly obovate, about 2·5 cm. long, pilose-setose near the middle of the margin ; leaves oblong-oblanceolate, rounded at base, obtuse at apex, 6–12 cm. long, 3–4·5 cm. broad, somewhat glaucous beneath ; lateral nerves about 15 pairs ; pedicels about 5 cm. long .. .. 1. *unwinii*

Inner petals much shorter than the outer crispate ones :

*Inner petals very narrow, with a pair of lateral hairy appendages about the middle ; leaves obovate-oblong, 15–20 cm. long, 4–5·5 cm. broad ; flowers borne on the previous season's growth ; sepals ovate-lanceolate, up to 5 cm. long and 3 cm. broad ; fruit ovoid, not ribbed, about 10 cm. long and 8·5 cm. broad 2. *tenuifolia*

*Inner petals very broad and obovate or clawed and spathulate, not appendaged, or the appendages near the base :

Inner petals with a long claw almost as long as the limb, spathulate ; pedicels very slender, 3 cm. long, with a lanceolate acute bract about the middle; sepals, lanceolate, crispate on the margin ; leaves obovate to oblong, acuminate, rounded at base, 6–8 cm. long, 2·5–4 cm. broad .. .. 3. *crispata*

Inner petals shortly clawed, broadly ovate :

Sepals lanceolate, up to 3·5 cm. long, with wavy crispate margins ; leaves elliptic to obovate-elliptic, rounded at base, acuminate, 15–45 cm. long, 5–20 cm. broad ; flowers large on long pedicels ; outer petals up to 10 cm. long ; fruit 10–15 cm. diam. .. .. 4. *myristica*

Sepals orbicular, 1 cm. long, not crispate on the margins ; leaves obovate to oblong, obtuse at base, shortly acuminate, 15–30 cm. long, 7–12 cm. broad ; outer petals up to 4·5 cm. long ; fruit ribbed, globose, 7·5 cm. diam. .. 5. *brevipes*

1. **M. unwinii** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 59 (1927) ; Kew Bull. 1927 : 153. A tree.
S.Nig.: Benin *Unwin* 45 !

2. **M. tenuifolia** *Benth.*—F.T.A. 1 : 38 ; Chev. Bot. 12. Small tree, up to 40 ft. high ; flowers appearing before the leaves, sepals green, petals white at base, yellow at the tips, with reddish spots.
Fr.G.: Timba to Frigniagbe (Mar.) *Pobéguin* 134 ! Near Mamou (Mar.) *Dalz.* 8395 ! **S.L.:** near Ninia, Talla Hills (Feb.) *Sc. Elliot* 4814 ! Kalangba (Feb.) *Glanville* 177 ! **Iv.C.:** *Aubrév.* 13 ! **G.C.:** Aquapim Hills (Feb.) *Johnson* 579 ! Aburi Road (Feb.) *Dalz.* 8270 ! **Togo:** *Kersting* A. 332 ! **Dah.:** Porto Novo (Jan.) *Chev.* 22860 ! **N.Nig.:** near Lafia (Feb.) *Hepburn* 52 ! **S.Nig.:** Eppah *Barter* 3298 ! Okomu F.R. (Mar.) *Ross* 116 ! Oban *Talbot* 1362 ! Old Calabar (Feb.) *Mann* 2249 ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 111 ! Johann-Albrechtschöhe *Staudt* 650 ! **F.Po:** *Mann* 164 (partly). (See Appendix, p. 6.)

3. **M. crispata** *Engl. & Diels* in Notizbl. Bot. Gart. Berl. 2 : 301 (1899). *M. angolensis* of F.T.A. 1 : 38, partly. A shrub or tree, up to 30 ft. ; outer petals purple-variegated, inner rose and white.
S.L.: Mano (Mar.) *Deighton* 1108 ! Near Zimi (Apr.) *Deighton* 3632 ! **Lib.:** Gola Forest (Mar.) *Bunting* ! Pandamai (Feb.) *Bequaert* 89 ! **G.C.:** Banka (Mar.) *Vigne* 1870 ! Kibi (Feb.) *Burnett* 48 ! **S.Nig.:** Old Calabar *Thomson* 89 ! Oban *Talbot* 1499 ! Eket *Talbot* 3221 ! Also in French Cameroons.

4. **M. myristica** (*Gaertn.*) *Dunal*—F.T.A. 1 : 37 ; Chev. Bot. 11. *Annona myristica* Gaertn. (1791). A tree, up to 60 ft. with large fragrant flowers ; calyx red-spotted ; petals yellow and red, the three inner spotted red outside and green inside ; fruit spherical, green.
Lib.: Grand Bassa (Mar.) *Dinklage* 1615 ! Dukwia R. *Cooper* 352 ! **G.C.:** Anobeko (Mar.) *Chipp* 123 ! Near Bompata (Dec.) *Dalz.* 119 ! Mampong Scarp (Mar.) *Vigne* 1060 ! **S.Nig.:** Ibadan F.R. (Apr.) *Punch* 150 ! Oban *Talbot* 1388 ! 1469 ! Old Calabar *Thomson* 62 ! **Br.Cam.:** Ambas Bay *Mann* 27 ! Victoria (Jan.) *Preuss* 1303 ! Also from French Cameroons to Uganda and Angola, and in Principe and S. Tomé. (See Appendix, p. 5.)

5. **M. brevipes** *Benth.*—F.T.A. 1 : 39. *M. preussii* Engl. & Diels in Notizbl. Bot. Gart. Berl. 2 : 301 (1899). A wide shrub or tree, up to 40 ft. high ; calyx and bracts pale green ; petals yellowish-cream, conspicuously blotched crimson.
Fr.G.: *Farmar* 333 ! **S.L.:** Scarcies R. (Jan.) *Sc. Elliot* 1892 ! Levuma, Koya (Dec.) *Deighton* 3843 ! **Lib.:** Kakatown *Whyte* ! Salala Dist. (Dec.) *Baldwin* 10621 ! Dukwia R. *Cooper* 83 ! **G.C.:** Prestea (Dec.) *Vigne* 3146 ! **S.Nig.:** Sapoba (Nov.) *Meikle & Keay* 605 ! Oban *Talbot* 145 ! Eket *Talbot* 3100 ! **Br.Cam.:** Victoria *Preuss* 1314 ! Bimbia Road *Maitland* 408 ! **F.Po:** *Mann* 164 (partly) ! Also in French Cameroons and Principe. (See Appendix, p. 5.)

5. MONIMIACEAE

Trees or shrubs, rarely climbers, usually fragrant, with opposite, or rarely alternate, entire or serrate, coriaceous leaves with pellucid dots ; stipules absent. Flowers actinomorphic, rarely oblique, hermaphrodite, polygamous or unisexual, cymose or racemose, rarely solitary, small or medium-sized ; inflorescence axillary or rarely terminal. Perianth inferior, with 4 to many often connivent teeth or lobes in 2 to many series and imbricate, equal, or the outer sepaloid and the inner petaloid, rarely obsolete. Disk adnate to the perianth-tube. Stamens numerous or few in 1–2 series ; filaments very short, often flattened, with or without glands at the base ; anthers erect, 2-celled, opening by a longitudinal slit or by valves from the base upwards. Female fl. : staminodes present or none ; carpels several or rarely solitary, 1-celled ; style short or elongated ; stigma terminal ; ovule solitary, erect or pendulous. Carpels separate in fruit, enclosed by the perianth or the latter deciduous, indehiscent, often drupaceous. Seed erect or pendulous ; testa membranous ; endosperm fleshy ; embryo small to half as large as the endosperm ; cotyledons erect or spreading.

Distributed in tropical and subtropical regions mainly of the Southern Hemisphere, absent from India (except Ceylon and Burma), and very rare in Africa. Recognized by the gland-dotted exstipulate leaves, apetalous flowers with the staminal disk adnate to the perianth-tube, 2-celled anthers opening by either slits or flaps (as in *Lauraceae*), the carpels separate in fruit, the endospermic seeds, and usually small embryo.

Plagiostyles Baill., formerly included in *Monimiaceae*, is now placed in *Euphorbiaceae*.

Perianth oblique with one lobe produced on one side into a tongue-like process, the other lobes small and deltoid ; flowers dioecious, few in axillary fascicles, pedicellate ;

leaves subopposite, markedly anisophyllous, the reduced leaf filiform, early caducous, often leaving a scar, so that leaves on a mature shoot appear alternate 1. **Glossocalyx**
Perianth symmetrical, lobes all deltoid ; flowers dioecious in axillary racemes ; leaves nearly opposite, both leaves of each pair well-developed, coriaceous ; leaf-margins coarsely and irregularly serrate, more rarely entire .. .. .. 2. **Xymalos**

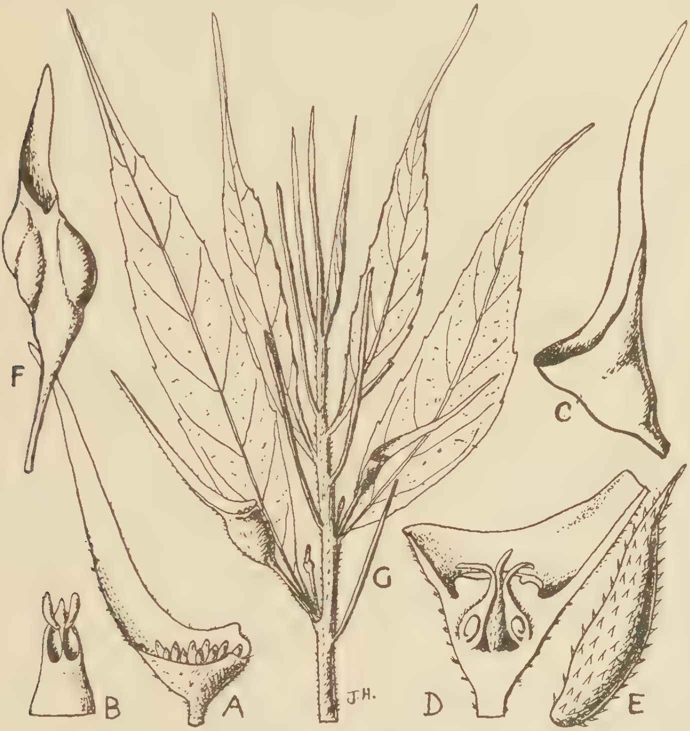

Fig. 13.—Glossocalyx longicuspis *Benth.* (Monimiaceae).
A, male flower. B, anther. C, female flower. D, section of same. E, mature carpel. F, fruit. G, reduced leaf. Partly after Perkins & Gilg.

1. **GLOSSOCALYX** Benth.—F.T.A. 6, 1 : 167.

Leaves equal-sided and narrowed at base, with scattered stellate hairs beneath ; petiole 0·5–1 cm. long ; perianth-limb linear-lanceolate, up to 2·5 cm. long 1. *longicuspis*
Leaves rounded or slightly cordate and unequal at base, sparingly strigose beneath with often bifurcate hairs ; petiole up to 5 mm. long :
Perianth-limb narrowed from near the base, more or less linear, up to 1 cm. long ; pedicels up to 7 mm. long .. .. 2. *staudtii*
Perianth-limb triangular, up to 5 mm. long ; pedicels up to 4 mm. long 3. *brevipes*

1. **G. longicuspis** *Benth.*—F.T.A. 6, 1 : 167 ; Perkins & Gilg in Engl. Pflanzenr. Monim. 116, t. 28 ; Thonner Fl. Pl. Afr. t. 50 ; Chev. Fl. Viv. 1 : 31. A tree, 30–40 ft. high ; young branches furnished with very short hairs.
F.Po: *Mann* 1428 ! Also in French Cameroons and Spanish Guinea.
2. **G. staudtii** *Engl.*—F.T.A. 6, 1 : 168 ; Perkins & Gilg l.c. 117. A shrub, up to 24 ft. high ; branches slightly flexuous, pithy ; flowers with an odour of nutmeg.
S.Nig.: Oban *Talbot* 84 ! **Br.Cam.:** Johann-Albrechtshöhe (Jan.) *Staudt* 808 ! Also in French Cameroons.
3. **G. brevipes** *Benth.*—F.T.A. 6, 1 : 168 ; Perkins & Gilg l.c. 116. A shrub, 10 ft. high ; flowers green.
Br.Cam.: Cameroons R. (Jan.) *Mann* 722 ! 2196 !

2. **XYMALOS** Baill.—F.T.A. 6, 1 : 167.

A shrub or medium-sized tree ; branches and leaves glabrous ; leaves obovate to narrowly elliptic, cuneate at base, 7–20 cm. long, 2·5–10 cm. broad, 6–8 pairs of main lateral nerves, prominent beneath, looping well within margin ; fruit ovoid, 1–1·5 cm. long, fleshy, crowned by persistent stigma, one-seeded .. .. .. *monospora*

X. monospora (*Harv.*) *Baill. ex Warb.*—F.T.A. 6, 1 : 169. *Xylosma monospora* Harv. Evergreen tree or shrub, leaves smelling of lemon ; fruit orange-coloured.
Br.Cam.: Bambulue Hill, Bamenda, 5,000—7,000 ft. (Jan., Oct.) *Johnstone* 211/31 ! 274/32 ! Lakom, Bamenda (May) *Maitland* 1372 ! **F.Po:** above Musola *Mildbr.* 7114. Moka, 3,800–5,700 ft. *Mildbr.* 7044. Widespread on mountains in central, east and south Africa.

6. LAURACEAE

Trees or shrubs, very rarely twining parasitic herbs, all parts with aromatic oil-glands. Leaves alternate, rarely opposite or subopposite, coriaceous and evergreen, variously nerved ; stipules absent. Flowers small, greenish or yellowish, usually cymose or racemose, hermaphrodite, polygamous or dioecious, actinomorphic. Calyx usually inferior ; tube sometimes enlarging in fruit ; lobes usually 6, imbricate. Petals absent. Stamens typically in 4 whorls, often the fourth row suppressed or reduced to staminodes ; filaments sometimes glandular at the base, very rarely the glands fused into a disk ; anthers continuous with the filament, 2- or 4-valved, cells superposed or more or less collateral, opening from the base upwards by flaps, introrse or sometimes the third whorl extrorse. Ovary superior, rarely inferior, 1-celled ; style terminal, simple ; stigma small. Ovule solitary, pendulous. Fruit baccate or drupaceous. Seed pendulous, without endosperm ; testa membranous ; embryo straight ; cotyledons thick, fleshy ; radicle superior.

Generally distributed in tropical and subtropical regions, but comparatively rare in Africa. Readily recognized by the simple aromatic evergreen leaves without stipules, the absence of petals, the characteristic dehiscence of the anthers, and the seed without endosperm.

Trees and shrubs with normal foliage :
  Anthers 2-valved ; fruit superior ; flowers hermaphrodite .. .. 1. **Beilschmiedia**
  Anthers 4-valved, the valves collateral ; fruit inferior ; flowers dioecious 2. **Hypodaphnis**
Leafless slender parasitic climbers ; stems filiform, glabrous to tomentose ; flowers small, spicate, with green receptacle and white calyx .. .. 3. **Cassytha**

Besides the above indigenous genera the following introduced plants are met with : *Persea americana* Mill. (syn. *P. gratissima* Gaertn. f.), the Avocado Pear, a native of tropical America, a dessert or salad fruit ; *Cinnamomum camphora* Nees & Eberm., the Camphor tree ; *C. zeylanicum* Nees, the Cinnamon tree ; and *C. cassia* Lour., natives of the Far East.

1. BEILSCHMIEDIA Nees—Robyns & Wilczek in Bull. Jard. Bot. Brux. 19 : 459 (1949).
Tylostemon Engl.—F.T.A. 6, 1 : 173 ; F.W.T.A., ed. 1, 1 : 61.

Stamens of the third whorl perfect (i.e. total of 9 fertile stamens) :
  Filaments of the outer two whorls of stamens elongated, generally narrow, considerably longer than the anthers :
    Perianth outside and pedicels glabrous, except for the often ciliate margins of the perianth lobes :
      Perianth, including the lobes, 1·5 mm. long ; leaves about 25 cm. and up to 11 cm. broad .. .. 1. *hutchinsoniana*
      Perianth, including the lobes, 2–3 mm. long when mature :
        Bracts early caducous, stamens of the third whorl with much narrower filaments than those of the outer two whorls ; petioles 6–15 mm. long ; leaves 10–22 cm. long, 4–10 cm. broad, often subopposite .. .. 2. *mannii*
        Bracts persistent, stamens of the third whorl subequal to those of the outer whorl ; petiole 4 mm. long ; leaves 8–12 cm. long, 3·5–5 cm. broad. . 3. *myrciifolia*
    Perianth outside and pedicels more or less densely puberulous, or tomentellous :
      Perianth, including the lobes, about 1 mm. long, densely tomentellous outside ; ovary hairy ; leaves lanceolate, long-acuminate, up to 25 cm. long and 7 cm. broad 4. *preussii*
      Perianth, including the lobes, 2–3 mm. long, evenly pubescent outside, but with the surface clearly visible between the hairs ; ovary glabrous :
        Bracts early caducous, perianth lobes densely pilose at the tips ; leaves 10–22 cm. long, 4–9 cm. broad, acutely acuminate .. .. .. 5. *chevalieri*
        Bracts persistent, perianth lobes sparingly but evenly puberulous ; leaves 15–20 cm. long, 6–8 cm. broad, acuminate .. .. 6. *staudtii*
  Filaments of the outer two whorls of stamens short and broad, scarcely as long as the anthers :
    Inflorescence lax, up to 18 cm. long and broad ; perianth densely rusty-puberulous ; leaves 12–20 cm. long, 4–7 cm. broad, drying brown .. .. 7. *talbotiae*
    Inflorescence short, up to 3 cm. long and 4 cm. broad ; perianth sparsely and minutely puberulous ; leaves 12–18 cm. long, 3–4 cm. broad, drying dark olive-green 8. *foliosa*

Stamens of the third whorl barren (i.e. total of 6 fertile stamens) :
 Perianth, including the lobes, about 2 mm. long, tomentellous ; inflorescence up to 12 cm. long ; leaves acute or obtuse at base, shortly acuminate, 8–23 cm. long, 2·5–7·5 cm. broad, obscurely reticulate above .. .. .. 9. *gaboonensis*
 Perianth, including the lobes, 3–4 mm. long, densely tomentellous ; inflorescence 10–18 cm. long ; leaves rounded at base, long-acuminate, 17–25 cm. long, 5–9 cm. broad, prominently reticulate on both surfaces .. .. .. 10. *caudata*

1. **B. hutchinsoniana** *Robyns & Wilczek* in Bull. Jard. Bot. Brux. 19 : 487 (1949). *Tylostemon macrophyllus* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 61 (1927) ; Kew Bull. 1927 : 153. *B. macrophylla* (Hutch. & Dalz.) A. Chev. Fl. Viv. 1 : 38 (1938), not of Meisn. (1864). Shrub or small tree.
S.Nig.: Oban *Talbot* 2301 ! 2302 ; 2322 ! **Br.Cam.:** Bulifambo, Buea (Mar.) *Maitland* 559 ! Also in French Cameroons. [Very close to *B. minutiflora* (Meisn.) Benth. & Hook. f. from Gabon, which has densely pubescent inflorescences.]

2. **B. mannii** *(Meisn.) Benth. & Hook. f.* Gen. Pl. 3, 1 : 158 (1880) ; Robyns & Wilczek l.c. 463 ; Fl. Congo Belge 2 : 428. *Oreodaphne ? mannii* Meisn. (1864). *Tylostemon mannii* (Meisn.) Stapf in F.T.A. 6, 1 : 178 ; F.W.T.A., ed. 1, 1 : 61. *B. elata* Sc. Elliot in J. Linn. Soc. 30 : 96 (1895) ; Chev. Fl. Viv. 1 : 36. *T. longipes* Stapf in F.T.A. 6, 1 : 179 (1909) ; F.W.T.A., ed. 1, 1 : 61 ; not of Hook. f. *B. stapfiana* Robyns & Wilczek in Bull. Jard. Bot. Brux. 19 : 479 (1949). *B. caudata* of Chev. Fl. Viv. 1 : 35, partly, not of Stapf. Forest tree with spreading crown, to 30 ft. high (straight tree to 100 ft. high, *fide* Cooper & Record); flowers green in lax panicles ; fruit red, ellipsoid, about 1½ in. long.
Fr.G.: *fide* Chev. *l.c.* **S.L.:** Mofari (Jan.) *Sc. Elliot* 4400 ! Musaia (fr. Mar.) *Sc. Elliot* 5125 ! Bumbuna (Oct.) *Thomas* 3255 ! **Lib.:** Dukwia R. (Apr.) *Cooper* 384 ! Kolahun (Nov.) *Baldwin* 10134 ! Vonjama (Oct.) *Baldwin* 9880 ! **Iv.C.:** Abidjan (July) *Aubrév.* 44 ! Banco (June) *Martineau* 261 ! **G.C.:** Anyinam (July) *Moor* 118 ! Kwaben (Aug.) *Vigne* 1296 ! Prestea (fl. & fr. Sept.) *Vigne* 3101 ! Nkwanta (Sept.) *Chipp* 367 ! **S.Nig.:** Calabar (Feb.) *Mann* 2255 (partly) ! 2255*a* ! Also in French Cameroons and extending to Gabon and Belgian Congo. (See Appendix, p. 10.)

3. **B. myrciifolia** *(S. Moore) Robyns & Wilczek* l.c. 478 (1949). *Tylostemon myrciifolius* S. Moore in Cat. Talb. 95 (1913) ; F.W.T.A., ed. 1, 1 : 61. Forest shrub.
S.Nig.: Oban *Talbot* 2334 !

4. **B. preussii** *Engl.* in Bot. Jahrb. 26 : 387, t. 9 (1899) ; Robyns & Wilczek l.c. 464. *Tylostemon preussii* (Engl.) Stapf in F.T.A. 6, 1 : 176 ; F.W.T.A., ed. 1, 1 : 61. Forest shrub.
Br.Cam.: between Victoria and Bimbia (May) *Preuss* 1272 !

5. **B. chevalieri** *Robyns & Wilczek* l.c. 486 (1949). *B. caudata* of Chev. Fl. Viv. 1 : 35, not of (Stapf) Chev. Shrub or tree, to 50 ft. high ; perianth pink.
Lib.: Gbanga (Sept.) *Linder* 618 ! **Iv.C.:** Yaba, Bas-Cavally (July) *Chev.* 19414 ; 19550.

6. **B. staudtii** *Engl.* l.c. 387, t. 9 D (1899) ; Robyns & Wilczek l.c. 464. *Tylostemon staudtii* (Engl.) Stapf in F.T.A. 6, 1 : 177 ; F.W.T.A., ed. 1, 1 : 61. A shrub, branches very minutely rusty-pubescent when quite young.
Br.Cam.: Johann-Albrechtshöhe (Feb.) *Staudt* 457 !

7. **B. talbotiae** *(S. Moore) Robyns & Wilczek* l.c. 494 (1949). *Tylostemon talbotiae* S. Moore in Cat. Talb. 94 (1913); F.W.T.A., ed. 1, 1 : 61. Shrub or small tree to 25 ft. high, in swamp or fringing forest.
S.Nig.: Degema (Aug.) *Bassey* 3/39 ! Oban *Talbot* 1539 ! s.n. ! **Br.Cam.:** Bulifambo, Buea (Mar.) *Maitland* 558 ! S. Bakundu F.R. (Mar.) *Brenan* 9413 ! Ngong, Bamenda (June) *Maitland* 1605 ! [An incomplete specimen (*Brenan* 9014) from Okomu F.R., S. Nigeria, probably belongs here also.]

8. **B. foliosa** *(S. Moore) Robyns & Wilczek* l.c. 488 (1949). *Tylostemon foliosus* S. Moore l.c. 96 (1913) ; F.W.T.A., ed. 1, 1 : 61. A bushy shrub.
S.Nig.: Oban *Talbot* 2342 ! s.n. !

9. **B. gaboonensis** *(Meisn.) Benth. & Hook. f.* Gen. Pl. 3, 1 : 158 (1880) ; Robyns & Wilczek l.c. 464 ; Fl. Congo Belge 2 : 435. *Oreodaphne gaboonensis* Meisn. (1864). *Tylostemon gaboonensis* (Meisn.) Stapf in F.T.A. 6, 1 : 183 ; F.W.T.A., ed. 1, 1 : 61. *T. obscurus* Stapf in F.T.A. 6, 1 : 183 (1909). *B. obscura* (Stapf) A. Chev. Fl. Viv. 1 : 41 (1938) ; Robyns & Wilczek in Bull. Jard. Bot. Brux. 19 : 464 (1949) ; Engl. ex Stapf in J. Linn. Soc. 37 : 112 (1905), name only. *T. confertus* S. Moore in J. Bot. 52 : 33 (1914) ; F.W.T.A., ed. 1, 1 : 61. *B. conferta* (S. Moore) Robyns & Wilczek l.c. 496. Tall forest tree, to 100 ft. high ; fruit obovoid to subglobose, about 1½ in. long.
S.Nig.: Eket *Talbot* 3399 ! Old Calabar (Feb.) *Mann* 2255 (partly) ! **Br.Cam.:** Victoria (Mar., fl. & fr. May) *Maitland* 535 ! 560 ! 688 ! Also in French Cameroons, Gabon and Belgian Congo. [Two gatherings by *Maitland* (147 ; 177) from Victoria are close to this species but have the inflorescence and perianth much more sparsely pubescent ; each specimen is described as a tall forest tree with straight bole, flowers Feb. and Dec.]

10. **B. caudata** *(Stapf) A. Chev.* Fl. Viv. 1 : 35 (1938) (excl. spec. *Chev.* 19414 and 19550 which are *B. chevalieri* Robyns & Wilczek, and *Aubrév.* 44 and 69 which are *B. mannii* (Meisn.) Benth. & Hook. f., excl. also ref. *Tylostemon* aff. *mannii* of Aubrév. Fl. For. C. Iv. 1 : 30, t. 45) ; Robyns & Wilczek l.c. 464. *Afrodaphne caudata* Stapf in J. Linn. Soc. 37 : 112 (1905). *Tylostemon caudatus* (Stapf) Stapf in F.T.A. 6, 1 : 181 ; F.W.T.A., ed. 1, 1 : 61. *Afrodaphne euryneura* Stapf in J. Linn. Soc. 37 : 112 (1905). *Tylostemon euryneura* (Stapf) Stapf in F.T.A. 6, 1 : 181 ; F.W.T.A., ed. 1, 1 : 61. *B. euryneura* (Stapf) Robyns & Wilczek l.c. 495. Forest tree or shrub.
Lib.: Sinoe Basin *Whyte* (3 sheets) ! [As 4 out of the 7 specimens cited by Chevalier in Fl. Viv. 1 : 36 are incorrectly identified, I hesitate, without seeing the specimens, to accept as this species the remaining records from Ivory Coast and Gold Coast.—R. W. J. K.]

Imperfectly known species.

1. **Tylostemon crassifolius** *Engl.*—F.T.A. 6, 1 : 185. A tree 60–120 ft. high ; flowers not known. Possibly a *Beilschmiedia.*
Br.Cam.: Johann-Albrechtshöhe (Dec.) *Staudt* 505 !

2. **Beilschmiedia djalonensis** *A. Chev.* Fl. Viv. 1 : 40 (1938), French descr. only. *Tylostemon* sp. 1 of Aubrév. Fl. For. C. Iv. 1 : 130. Tall forest tree, to 120 ft. high ; leaves very thick. Androecium not described.
Fr.G.: Dalaba *Chev.* 18135 ; 18888 ; 34574. **Iv.C.:** Malamosso *Chev.* 16248. Tabou (fr. Apr.) *Aubrév.* 1315 ! 1664 !

Considerably more good specimens and accurate field observations are needed before the W. African species of this difficult genus can be adequately understood. Specimens lacking mature flowers are useless, but systematic collections from marked trees to show young and mature flowers, fruits, and the range of leaf-shape would be of great value. The important revision by Robyns and Wilczek is valuable in distinguishing the sections and the Belgian Congo species, but does not enable one to distinguish the other species many of which are very doubtfully distinct.—R. W. J. K.

2. HYPODAPHNIS Stapf—F.T.A. 6, 1 : 185.

A tree ; young parts rusty-pubescent ; leaves elliptic to obovate, acutely acuminate, shortly acute at base, 12–25 cm. long, up to 10 cm. broad, slightly puberulous on the nerves ; lateral nerves 4–5 on each side of midrib, ascending ; tertiary nerves subparallel, at length conspicuous ; petiole up to 3–5 cm. long ; panicle subcorymbose, 3·5–8 cm. long, many-flowered, finely rusty-pubescent all over .. .. *zenkeri*

H. zenkeri (*Engl.*) *Stapf* in F.T.A. 6, 1 : 185 (1909) ; Hook. Ic. Pl. t. 2938 ; Chev. Fl. Viv. 1 : 44. Lower storey tree of forest, to 50 ft. high ; bark smooth, grey ; slash cream darkening to dirty brown, with black edge ; leaves deep green ; seeds ovoid with flattened sides, about 4·5 cm. long and 3 cm. broad. **S.Nig.:** Okomu F.R. (Feb.) *Brenan* 9058 ! Sapoba (Apr.) *Kennedy* 779 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 961 ! Also in French Cameroons. (See Appendix, p. 10.)

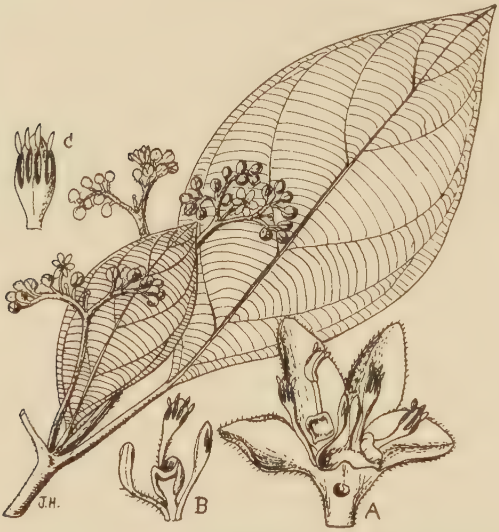

FIG. 14. — HYPODAPHNIS ZENKERI (*Engl.*) *Stapf* (LAURACEAE).

A, flower in vertical section.

B, stamens and a gland.

C, anther.

3. CASSYTHA Linn.—F.T.A. 6, 1 : 188.

Twining parasitic herbs, with the leaves reduced to minute scales, adhering to the host by means of haustoria ; flowers white, small, loosely spicate, often rusty-pubescent ; bracteoles ciliolate ; outer perianth-segments similar to the bracteoles, the inner broadly ovate-oblong, longer than the outer ; fruits crowned with the persistent perianth-limb, 4–6 mm. in diam. .. .. *filiformis*

C. filiformis *Linn.*—F.T.A. 6, 1 : 188 ; Chev. Fl. Viv. 1 : 45. *C. senegalensis* A. Chev. l.c. 1 : 46 (1938), French descr. only. **Sen.:** *Roger* ! **S.L.:** *Sc. Elliot* 4177 ! 5875 ! Freetown (Feb.) *Johnston* 71 ! **Lib.:** Monrovia (Nov.) *Linder* 1415 ! **G.C.:** Aburi (June) *Johnson* 970 ! Kintampo *Vigne* 3057 ! **Togo:** Lome *Warnecke* 53 ! **N.Nig.:** Nupe *Barter* 412 ! Vom *Dent Young* 219 ! **S.Nig.:** Lagos *MacGregor* 33 ! Oyo (Feb.) *Brenan & Keay* 8964 ! Niger mouth (Aug.) *Mann* 464 ! Very common throughout the area and in the tropics generally. (See Appendix, p. 10.)

7. HERNANDIACEAE

Trees or shrubs, sometimes scandent, with alternate, simple or digitately compound leaves ; stipules absent. Flowers hermaphrodite, or monoecious or polygamous by abortion, actinomorphic, arranged in axillary corymbose or paniculate cymes, bracteate or not. Calyx with 3–5 valvate subequal segments in two whorls or rarely 4–8 in one whorl. Stamens 3–5 in a single whorl, when the perianth is double opposite the outer segments, often 4 ; anthers 2-celled, opening introrsely or laterally by 2 valves ; staminodes gland-like, in one or two whorls outside the stamens, or absent, those of the outer whorl in pairs at the base of the filaments, those of the inner whorl alternate with the stamens. Ovary single, inferior, 1-celled ; ovule solitary, pendulous. Fruit dry, more or less ribbed, either with 2–4 wings on the body or with two terminal wings formed by enlarged perianth-segments, or wingless but enclosed in the inflated receptacle. Seed solitary, without endosperm ; testa leathery ; embryo straight ; cotyledons large, plano-convex or flat and twisted around the radicle.

Distributed in the tropics of both hemispheres, mainly near the coasts, and especially on oceanic islands.

Leaves simple ; sometimes peltate ; fruits surrounded by the inflated calyx ; flowers monoecious ; calyx-lobes 6–8 ; petals absent ; stamens 3–4 .. 1. **Hernandia**
Leaves digitately compound ; fruits with 2–4 broad lateral wings ; flowers hermaphrodite ; calyx-lobes 5 ; petals 5 ; stamens 5 .. .. .. 2. **Illigera**
Leaves simple broadly ovate, often deeply 3–5-lobed ; fruits with two long terminal wings ; flowers male and hermaphrodite ; calyx-lobes 4–7 ; petals absent ; stamens 4 alternating with the staminodes .. .. 3. **Gyrocarpus**

1. HERNANDIA Linn.—F.T.A. 6, 1 : 191.

Tree ; branchlets stout, minutely puberulous ; leaves ovate, rounded or very slightly cuneate at base, up to 22 cm. long and 13 cm. broad, firmly papery, glabrous, 5-nerved at the base ; petiole up to 12 cm. in fruiting specimens ; corymbs many-flowered, on stout peduncles ; fruits broadly ellipsoid, ribbed, 2·5 cm. long, the calyx up to about 4 cm. long .. .. *beninensis*

H. beninensis *Welw. ex Henriq.*—F.T.A. 6, 1 : 192 ; Exell Cat. S. Tomé 280. A tree 30–40 ft. high.
F.Po: *Mann* 1418 ! Also in S. Tomé.

2. ILLIGERA Blume—F.T.A. 6 : 192.

Leaves normally 5-foliolate, but sometimes 3-foliolate in the inflorescence ; leaflets ovate, oblong-elliptic to ovate-lanceolate, acuminate, acumen itself obtuse, obtuse, rounded or subcordate at base, with 2 (rarely 3) strong lateral nerves on each side of midrib, 5–8 cm. long, 3·5–6 cm. broad ; midrib, lateral nerves and veins sparingly hirsute beneath ; petiole often tendriliform, up to 10 cm. long, petiolules about 2 cm. long, hirsute when young ; cymes paniculate, axillary, shortly tomentose, the flowers merely puberulous or nearly glabrous ; fruits 2·5 cm. long, about 10 cm. from tip to tip of the wings, finely puberulous .. .. 1. *pentaphylla*
Leaves 3-foliolate ; leaflets obovate, rounded or obtuse at apex, obtuse to cuneate at base, with 1 (rarely 2) strong lateral nerves on each side of midrib ; midrib sparsely hirsute beneath near base only, leaves otherwise glabrous, rather smaller than in the above species .. .. 2. *vespertilio*

1. **I. pentaphylla** *Welw.*—F.T.A. 6, 1 : 192 ; Chev. Fl. Viv. 1 : 49 ; Keay in Kew Bull. 1952 : 157, 158. Stout forest liane.
Iv.C.: Bouroukrou *Chev.* 16642 ! **G.C.:** Aburi Hills (June) *Brown* 317 ! Sukyen (fr. June) *Thompson* 94 ! Kumasi (fr. June) *Vigne* 2003 ! **S.Nig.:** Okomu F.R. *Brenan & Onochie* 9000 ! Ibadan North F.R. (fr. Aug.) *Ahmed & Chizea* FHI 20024 ! **Br.Cam.:** Buea (May) *Maitland* 665 ! Bali-Ngemba F.R., Bamenda (May) *Ujor* FHI 30346 ! Also in French Cameroons, Spanish Guinea, Congo, Uganda and Angola.

2. **I. vespertilio** (*Benth.*) *Bak. f.* in J. Bot. 63 : 174 (1925) (excl. syn. *I. pentaphylla* Welw.) ; F.W.T.A., ed. 1, 2 : 382, 605 (excl. syn. *I. pentaphylla* Welw.) ; Keay l.c. *Dioscorea vespertilio* Benth. in Hook. Fl. Nigrit. 538 (1849). Liane, like the last, with white flowers.
S.L.: *Don* ! **Lib.:** Gbanga (Sept.) *Linder* 381 ! Also in French Cameroons.

3. GYROCARPUS Jacq.—F.T.A. 6, 1 : 189.

A tree ; leaves crowded towards the ends of the branches ; petioles 2·5–17 cm. long, blade broadly ovate, acuminate, sometimes deeply 3- (rarely 5-) lobed, averaging about

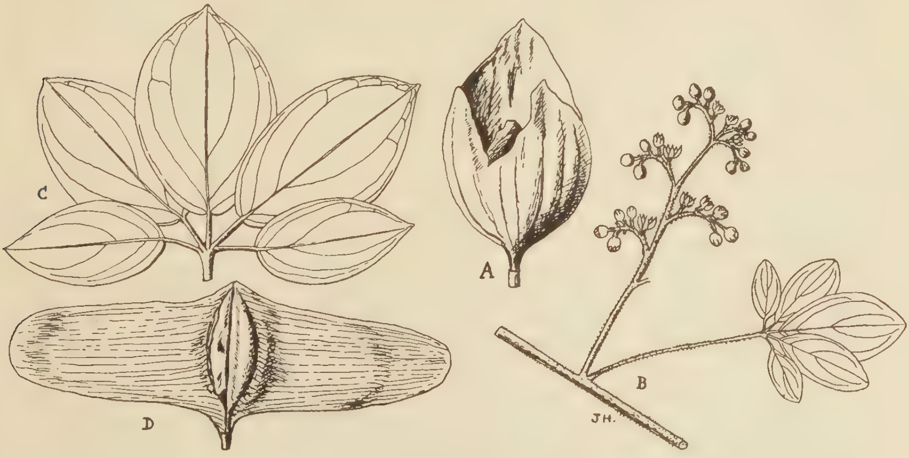

FIG. 15.—HERNANDIACEAE.

A, *Hernandia beninensis* Welw. ex Henriq., fruit. B, *Illigera pentaphylla* Welw., branch with leaf and inflorescence. C, leaf. D, fruit.

12 cm. diam., but reaching 25 cm., pubescent ; flowers in ample terminal cymes up to about 12 cm. long, pubescent ; flowers either all male in a cyme, or the terminal ones hermaphrodite, 1–2 mm. long ; fruit ovoid, velvety, about 1–2 cm. long, with a pair of elongate spathulate wings 5–10 cm. long .. .. *americanus*

G. americanus *Jacq.*—Chev. Fl. Viv. 1 : 47. *G. asiaticus* Willd.—F.T.A. 6, 1 : 190. Tree, 25–50 ft. high ; flowers greenish-yellow or cream.
Fr.Sud.: rocky hills between Diré and Bandiagra *Rogeon & Leclerq* 306 *bis*. Kita (fr. July) *Jaeger* 15 !
Also in other parts of tropical and south Africa, and in tropical Asia, Polynesia and South America.

8. MYRISTICACEAE

Trees, often large and frequently aromatic. Leaves alternate, entire, penninerved, often with pellucid dots ; stipules absent. Flowers small, dioecious, apetalous, fascicled, racemose, umbellate or capitate. Calyx 3- (rarely 2–5-) lobed, funnel-shaped to globose or saucer-shaped, lobes valvate. Male flower : stamens 2–30 ; filaments united into a column ; anthers 2-celled, free or united in a mass, dehiscing longitudinally ; rudimentary ovary absent. Female flower : staminodes absent ; ovary superior, sessile, 1-celled ; stigma subsessile ; ovule 1, almost basal. Fruit fleshy, usually dehiscing by two valves. Seeds erect, with a thin or fleshy, sometimes laciniate, often coloured aril; endosperm copious, replete with fat and often starch, mostly ruminate ; embryo small ; cotyledons ascending or spreading, sometimes connate.

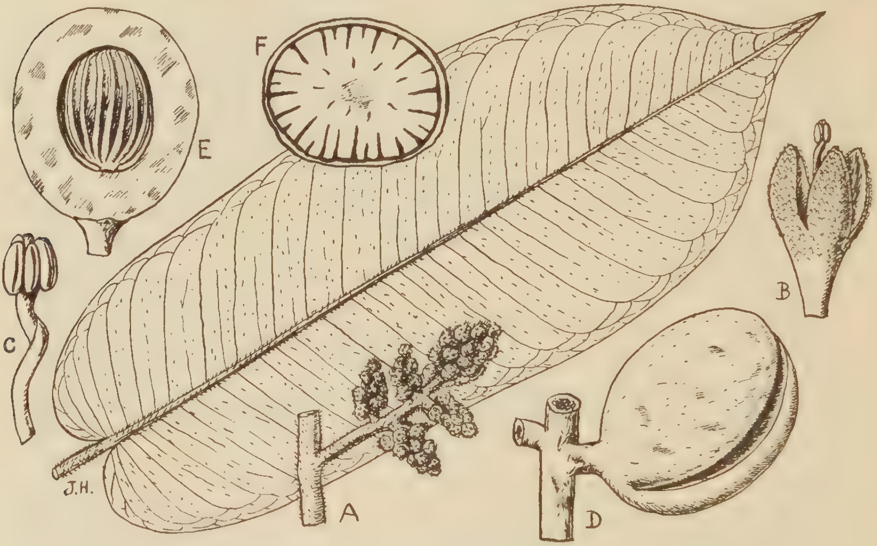

Fig. 16.—Pycnanthus angolensis (*Welw.*) *Warb.* (Myristicaceae).
A, portion of male inflorescence. B, male flower. C, staminal column. D, fruit. E, fruit in longitudinal section showing seed and aril. F, cross-section of seed.

Generally distributed in the tropics, comparatively rare in Africa, abundant in Tropical Asia and America. Recognized by habit and aromatic leaves, small dioecious flowers, the seeds often rich in fat and conspicuously arillate.

Lateral nerves of the leaves prominent, often numerous ; endosperm ruminate :
  Leaves with 15–60 usually very marked lateral nerves on each side of the midrib ; male flower-heads paniculate or in umbels without a common involucre ; seeds solid in the middle :
    Male flowers sessile in small heads arranged in a divaricate panicle ; anthers 2–4 ; fruit oblong, 3–4 cm. long ; aril of seed laciniate .. .. .. 1. **Pycnanthus**
    Male flowers pedicellate, in small head-like umbels, the umbels solitary or crowded in reduced panicles ; anthers 6–10 ; fruit depressed ; aril entire 2. **Scyphocephalium**

Leaves with 7–10 slender curved lateral nerves on each side of the midrib ; male flower-heads at first enclosed in a common involucre which falls away except the persistent disk-like base ; seed with a longitudinal cavity in the middle **3. Coelocaryon**

Lateral nerves faint, rather few ; endosperm not ruminate ; flower-heads almost sessile in the leaf-axils, solitary or in small clusters ; aril entire **4. Staudtia**

The Nutmeg, *Myristica fragrans* Houtt., has been introduced in various parts of our area.

1. PYCNANTHUS Warb.—F.T.A. 6, 1 : 157.

Leaves cordate at base, with 20–35 prominent lateral nerves on each side ; indumentum of the leaves rusty, composed of branched hairs ; male flower-heads about 5 mm. in diam., crowded .. .. 1. *angolensis*

Leaves cordate at base, with 40–60 prominent lateral nerves on each side ; indumentum of leaves of minute papillous stellate hairs ; male flower-heads about 3 mm. in diam., laxly arranged .. .. 2. *microcephalus*

Leaves shortly cuneate at base, with 15–18 rather obscure lateral nerves on each side ; indumentum merely papillous below ; male flower-heads about 3 mm. in diam., laxly arranged .. .. 3. *dinklagei*

1. **P. angolensis** (*Welw.*) *Warb.* in Notizbl. Bot. Gart. Berl. 1 : 100 (1895). *Myristica angolensis* Welw. (1862). *M. kombo* Baill. (1868). *P. kombo* (Baill.) Warb.—F.T.A. 6, 1 : 158 ; F.W.T.A., ed. 1, 1 : 64 ; Chev. Fl. Viv. 1 : 51 ; Thonner Fl. Pl. Afr. t. 49. A forest tree up to 120 ft. high, with long straight bole up to 15 ft. in girth ; crown of horizontal, whorled branches ; bark exuding red sticky juice when cut ; fruit dehiscent with single seed covered by bright red laciniate aril.
Fr.G.: Timbo (Dec.) *Caille* 14779 ! **S.L.:** Commendi (Nov.) *Aylmer* 266 ! Njala (Dec.) *Deighton* 2578 ! Bo (Feb.) *Lane-Poole* 174 ! **Iv.C.:** Bouroukrou (Dec.) *Chev.* 16101 *bis* ! Bouake *Aubrév.* 831 ! **G.C.:** Sunyani (Jan.) *Chipp* 73 ! Between Amfoi and Alafanjo (June) *Krause* ! Dunkwa (Nov.) *Vigne* 245 ! **Togo:** Alakgama *Doering* 901. **S.Nig.:** Ibadan F.R. (Dec.) *Punch* 126 ! Asaba *Leslie* 43 ! Ajaiye (Dec.) *Yates* 3 ! Awka *Jones* FHI 6603 ! **Br.Cam.:** Likomba (Nov.) *Mildbr.* 10699 ! Also from French Cameroons to Uganda and Angola, and in S. Tomé. (See Appendix, p. 11.)
2. **P. microcephalus** (*Benth.*) *Warb.* l.c. ; F.T.A. 6, 1 : 159 (1909) ; Chev. Fl. Viv. 1 : 53. *Myristica microcephala* Benth. (1878). A forest tree to 80 ft. high.
S.Nig.: Oban *Talbot* 53 ! **F.Po:** (Nov.) *Mann* 572 ! Also in French Cameroons and Spanish Guinea.
3. **P. dinklagei** *Warb.*—F.T.A. 6, 1 : 159 ; Chev. Fl. Viv. 1 : 54. A forest liane ; the type is described as a tree about 30 ft. high with drooping branches, but all subsequent collections are described as lianes ; Dinklage's specimen may well have been a liane draping a tree.
S.L.: Bumbu (Feb.) *Lane-Poole* 170 ! Falaba (Apr.) *Aylmer* 39 ! **Lib.:** Grand Bassa (Feb.) *Dinklage* 2096 ! Dukwia R. (Mar.) *Cooper* 299 ! Suen (Nov.) *Linder* 1397 ! **Iv.C.:** *fide* Chev. *l.c.*

2. SCYPHOCEPHALIUM Warb.—F.T.A. 6, 1 : 160.

A tree ; leaves slightly falcate, oblong to oblanceolate, acuminate, obtuse at base, 14–30 cm. long, up to 13 cm. broad, papery, glabrescent ; lateral nerves up to 20 pairs, prominent beneath ; male flowers in dense head-like axillary branched inflorescences, fulvous ; peduncles stout .. .. *mannii*

S. mannii (*Benth.*) *Warb.*—F.T.A. 6, 1 : 161 ; Chev. Fl. Viv. 1 : 55. *Myristica mannii* Benth. (1878). A forest tree, 40–100 ft. high.
S.Nig.: Old Calabar *Mann* 2290 ! Oban *Talbot* 1316 ! 1507 ! 1673 ! Eket *Talbot* 3145 ! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 752 ! Victoria (Feb.) *Maitland* 403 ! Kumba Dist. (Feb., Mar.) *Smith* 76/36 ! *Jeme* 17/38 ! Also in French Cameroons.

3. COELOCARYON Warb.—F.T.A. 6, 1 : 162.

Fruits obtuse, ovoid-oblong to oblong-ellipsoid, 2·5–4 cm. long, 2–3 cm. diam. ; testa reddish-brown, shining, deeply grooved ; leaves obovate-oblong to elliptic or lanceolate-oblong, obtuse to long-cuneate at base, 10–25 cm. long, 3–10 cm. broad, lateral nerves 6–13 pairs ; inflorescences pubescent or glabrous .. .. 1. *preussii*

Fruits beaked, oblong-ellipsoid, 2·5–3 cm. long, 1 cm. diam. ; testa brown, not grooved ; leaves obovate-elliptic, obtuse at base, 10–15 cm. long, 5–7 cm. broad, lateral nerves 6–8 pairs ; inflorescences glabrous .. .. 2. *oxycarpum*

1. **C. preussii** *Warb.* in Notizbl. Bot. Gart. Berl. 1 : 99 (1895) ; F.T.A. 6, 1 : 163 ; Chev. Fl. Viv. 1 : 58. *C. klainei* Pierre (1903)—F.T.A. 6, 1 : 162. Tall tree of rain forest, to 100 ft. high, with long clear bole without buttresses ; branchlets rufous-puberulous near the tips.
Lib.: Dukwia R. (fr. May) *Cooper* 433 ! Ganta (Feb.) *Harley* 1151 ! **Iv.C.:** *fide* Chev. *l.c.* **S.Nig.:** Okomu F.R. (Mar.) *Hide* 38/37 ! Sapoba (Aug.) *Kennedy* 960 ! 1739 ! 1848 ! Ukpon F.R. (Mar.) *Catterall* 3 ! Uwet (fr. Apr.) FHI 980 ! **Br.Cam.:** Victoria (May) *Preuss* 331 ! *Maitland* 435 ! Bibundi (Nov.) *Mildbr.* 10653 ! Also in French Cameroons Gabon and Congo. (See Appendix, p. 11.)
2. **C. oxycarpum** *Stapf* in F.T.A. 6, 1 : 164 (1909) ; Chev. Fl. Viv. 1 : 56. A forest tree with glabrous branches.
Fr.G.: Farana, R. Niger (fr. May) *Chev.* 13178 ! **Iv.C.:** Dabou (Feb.) *Chev.* 16213. **G.C.:** Kwahu (Dec.) *Vigne* 3191 ! (See Appendix, p. 11.)

4. **STAUDTIA** Warb.—F.T.A. 6, 1 : 164.

Fruit 2–3·5 cm. long, 1·4–1·8 cm. broad, with stipe 2–8 mm. long or sessile in malformed fruits ; leaves oblong to oblong-lanceolate, acuminate, 10–18 cm. long, 3–6·5 cm. broad, glabrous ; midrib prominent on both surfaces, petiole channelled above
1. *stipitata*

Fruit 5 cm. long, 3·5 cm. broad, with stipe 2–4 mm. long ; otherwise as above
2. *kamerunensis*

1. **S. stipitata** *Warb.* in Engl. Bot. Jahrb. 33 : 384 (Mar. 1903) ; F.T.A. 6, 1 : 165 ; Chev. Fl. Viv. 1 : 59. *S. gabonensis* Warb. l.c. 384–385 (Mar. & Dec. 1903) ; F.T.A. 6, 1 : 165. Hard-wooded forest tree, reaching over 100 ft. in height ; bark scaly yellow-brown exuding red juice when slashed ; fruits brown, seed with red aril.
N.Nig.: Ibaji-Ojoku F.R., Kabba (fr. Feb.) *Taylor* 11 ! **S.Nig.:** Epe (fr. Jan.) *Onochie & Ladipo* FHI 20656 ! Sapoba *Kennedy* 796 ! 2223 ! 2337 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 484 ! 751 ! Likomba *Mildbr.* 10580. Mamfe (Oct.) *Johnstone* 249/31 ! Also in French Cameroons, Gabon, Belgian Congo and Cabinda. (See Appendix, p. 12.)

2. **S. kamerunensis** *Warb.* in Nov. Act. Nat. Cur. 68 : 241 (1897) ; F.T.A. 6, 1 : 165. Tree like the last, but with considerably larger fruits.
Br.Cam.: Victoria Bot. Gardens *Winkler* 1090 ; 1335. Also in French Cameroons.

9. RANUNCULACEAE

Perennial (rarely annual) herbs with alternate leaves, or rarely shrubs or climbers with opposite leaves ; stipules absent. Indumentum of simple hairs. Flowers hermaphrodite, hypogynous, usually actinomorphic. Perianth usually double, of calyx and corolla, or rarely the calyx petaloid and the petals absent. Sepals imbricate or valvate. Petals when present often with a nectariferous claw. Stamens numerous, free from one another ; anthers dehiscing longitudinally. Carpels numerous, free or rarely partially connate, with a slightly bifid style or subsessile stigma. Ovules numerous or solitary. Fruit a bunch of follicles, rarely baccate, or of dry achenes with often persistent and elongated styles. Seeds small, usually smooth ; embryo very small, at the base of horny or fleshy endosperm.

Abundant in temperate and cold regions of the Northern, comparatively rare in the Southern Hemisphere, and very rare in the tropics ; poorly represented in our area, but interesting isolated species of northern genera are found at high altitudes in the mountains of East and South Africa. *Clematopsis* is endemic to Africa and Madagascar, and the African species of *Thalictrum*, with their long, thread-like pedicels, differ markedly from most of the species from the Northern Hemisphere.

Flowers regular :

Petals present, yellow, with nectaries ; sepals not petaloid ; fruit of numerous glabrous achenes, without long hairy tails .. .. 1. **Ranunculus**

Petals absent :

Sepals green, small, imbricate ; stamens few, with glabrous filaments ; leaves alternate, compound, with small and maidenhair-fern-like leaflets ; pedicels very slender and much elongated in fruit ; achenes solitary, ribbed, not hairy
2. **Thalictrum**

Sepals petaloid, large, induplicate-valvate or partly imbricate ; stamens numerous, with hairy filaments ; leaves opposite, simple or compound ; pedicels not elongate ; achenes in a cluster, hairy and with long hairy tails :

Low anemone-like herbaceous savannah plants arising from woody rhizomes ; sepals partly imbricate and partly valvate ; flowers mostly solitary 3. **Clematopsis**

Tall climbing plants ; sepals induplicate-valvate ; flowers often paniculate
4. **Clematis**

Flowers irregular ; sepals petaloid, posterior sepal spurred ; petals present ; flowers bright blue ; fruit of 3 follicles .. .. 5. **Delphinium**

Besides the above genera, Chevalier (Fl. Viv. 1 : 81) records that *Nigella sativa* Linn. is cultivated in gardens at Timbuktu.

1. **RANUNCULUS** Linn.—F.T.A. 1 : 8.

Lowest leaflets of radical leaves ovate to lanceolate, irregularly lobed and toothed, with petiolules longer than the leaflets ; stems creeping, rooting at the nodes ; fruit with up to about 15 achenes ; sepals green, deciduous, petals up to 7 mm. long
1. *extensus*

Lowest leaflets of radical leaves linear, irregularly lobed and toothed, with petiolules shorter than the leaflets ; stems usually erect ; fruit with numerous achenes, at least 20 ; flowers as above .. .. 2. *multifidus*

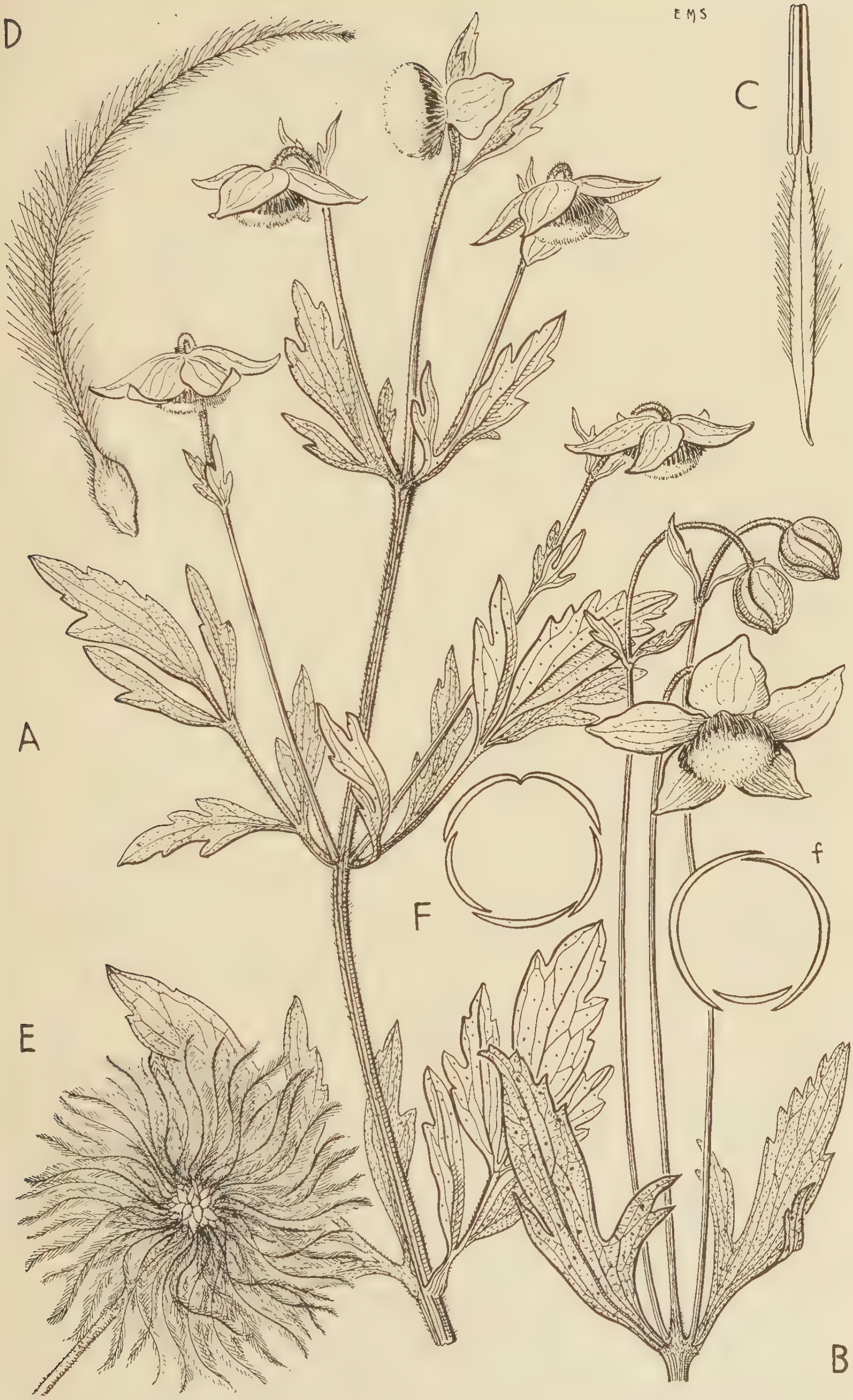

FIG. 17.—CLEMATOPSIS SCABIOSIFOLIA (*DC.*) *Hutch.* (RANUNCULACEAE).

A, flowering shoot, × 1/2. B, ditto, × 2/3. C, stamen, × 5. D, fruiting carpel, × 3. E, fruit, × 1. F & f, diagrams showing arrangement of sepals in flowers with 3 and 5 sepals. Drawn from *Keay* FHI 28429.

1. **R. extensus** (*Hook. f.*) *Schube ex Engl.* in Abb. Preuss. Akad. Wiss. 1891 : 218. *R. pinnatus* Poir. var. *extensus* Hook. f.—F.T.A. 1 : 10. Perennial herb, rooting at the nodes, flowers yellow.
Br.Cam.: Cam. Mt., Litoka, 4,400 ft. (fl. & fr. Apr.) *Maitland* 1121 ! **F.Po:** Clarence Peak, 8,500 ft. (Dec.) *Mann* 618 ! Serrano Peak (Jan.) *Guinea* 2004 !

2. **R. multifidus** *Forsk.* Fl. Aegypt.-Arab. 102 (1775) ; Turrill & Milne-Redhead F.T.E.A. Ranunc. 19. *R. pubescens* Thunb. Prod. Pl. Cap. 94 (1800) ; Chev. Fl. Viv. 1 : 82. *R. pinnatus* of F.T.A. 1 : 9, not of Poir. Perennial herb most often with erect stems, up to 4 ft. high, flowers yellow.
N.Nig.: Bauchi Plateau, in long grass by streams (July) *Lely* P. 374 ! Also in E. Africa, from Arabia to Cape Province and Angola.

2. THALICTRUM Linn.—F.T.A. 1 : 8.

A slender herbaceous plant 1–4 m. high, with numerous small leaflets ; pedicels very long and filiform, much elongating in fruit ; sepals small and greenish ; petals absent ; stamens 6–11, slightly exserted ; fruits prominently ribbed, capped by a large, persistent style .. .. *rhynchocarpum*

T. rhynchocarpum *Dill. & Rich.*—F.T.A. 1 : 8 ; Turrill & Milne-Redhead F.T.E.A. Ranunc. 11. *T. mannii* Hutch. in F.W.T.A., ed. 1, 1 : 66 ; Kew Bull. 1927 : 154 ; Chev. Fl. Viv. 1 : 79.
Br.Cam.: Nkwe, Bamenda (fr. Aug.) *Tamajong* FHI 23452 ! Cam. Mt., 3,000–8,000 ft. (fl. & fr. Jan., fr. Apr.–Nov.) *Mann* 1999 ! *Keay* FHI 28599 ! *Deistel* 644 ! **F.Po:** Clarence Peak, 6,000 ft. *Mann* 293 ! Musola to Moka (fr. Jan.) *Guinea* 1772. Also in highlands of E. Africa.

3. CLEMATOPSIS Boj. ex Hutch. in Kew Bull. 1920 : 12.

Erect perennial herb with stout rhizome ; stems 0·7–1·5 m. tall, strongly longitudinally striate, with long hairs or glabrescent ; leaves pinnate to bipinnate or trifoliate, lobes very irregular in shape ; stems 1–5-flowered ; flowers solitary, 3·5–5 cm. diam. ; sepals more or less spreading, softly pubescent on both surfaces ; anthers up to 5 mm. long ; achenes in heads up to 10 cm. in diam. .. .. *scabiosifolia*

C. scabiosifolia (*DC.*) *Hutch.* in Kew Bull. 1920 : 20 ; Turrill & Milne-Redhead F.T.E.A. Ranunc. 7. *Clematis scabiosifolia* DC. (1818). *Clematopsis oliveri* Hutch. l.c. ; F.W.T.A., ed. 1, 1 : 66 ; Chev. Fl. Viv. 1 : 79. *Clematopsis nigerica* Hutch. in F.W.T.A., ed. 1, 1 : 66 (1927) ; Kew Bull. 1927 : 154. Flowering stems appearing in grassland after fire ; sepals white, cream, mauve or pink.
N.Nig.: Bauchi Plateau (June) *Lamb* ! Vom, 3,000–4,500 ft., *Dent Young* 1 ! 2 ! Naraguta (fl. Jan., fr. Apr.) *Lely* P. 128 ! 732 ! **Br.Cam.:** Bamenda, 5,000 ft. (Jan.) *Migeod* 393 ! Bambui, 4,000 ft. (fr. Apr.) *Maitland* 1628 ! Jakiri, 5,500 ft.(Jan.) *Keay* FHI 28429 ! Also in French Cameroons, and throughout tropical E. Africa to the Transvaal.

4. CLEMATIS Linn.—F.T.A. 1 : 4.

Flowers 1–3 in each inflorescence ; sepals yellowish, erect at anthesis, calyx thus more or less campanulate ; carpels very numerous :

Flowers large ; sepals about 5 cm. long, tips reflexed ; leaflets ovate with short acute teeth, averaging about 10 cm. long and 5 cm. broad, more or less cordate at base, densely pilose to pubescent or almost glabrous beneath ; achenes (including persistent style) 8–10 cm. long .. .. 1. *grandiflora*

Flowers much smaller ; sepals about 1·8 cm. long, not reflexed ; leaflets ovate-lanceolate, entire to remotely denticulate, 2·5–6 cm. long, 0·7–2·5 cm. broad, rounded at base, pubescent to glabrous beneath ; achenes (including persistent style) about 4 cm. long .. .. 2. *kakoulimensis*

Flowers numerous in a panicle ; sepals white or greenish-white, less than 1·5 cm. long, not reflexed ; leaflets mostly less than 8 cm. long and 5 cm. broad ; carpels not *very* numerous :

Leaflets usually rather coarsely lobed as well as toothed, shortly pubescent beneath 3. *hirsuta*

Leaflets only serrate-dentate, rarely slightly lobulate, glabrous or nearly so beneath 4. *simensis*

1. **C. grandiflora** *DC.*—F.T.A. 1 : 7 ; Chev. Fl. Viv. 1 : 73 ; Turrill & Milne-Redhead in F.T.E.A. Ranunc. 2. A climber in low bush and forest margins, in forest regions.
Fr.G.: *Farmar* 258 ! Fouta Djalon (fr. Dec.) *Chev.* 20329 ! **S.L.:** *Afzelius* ! Near Kukuna (fr. Jan.) *Sc. Elliot* 4670 ! Regent (Dec.) *Sc. Elliot* 3940 ! Hill Station (Dec.) *Deighton* 481 ! *Smythe* 54 ! Bintumane Peak, 5,400 ft. (Jan.) *T. S. Jones* 158 ! **Lib.:** Mt. Mpaka Fossa (fr. Jan.) *Bequaert* 32 ! **G.C.:** Kumasi (fr. Jan.) *Andoh* 4130 ! S. Fomang Su F.R. (Jan.) *Vigne* 2681 ! **S.Nig.:** Oban *Talbot* 239 ! 1411 ! **Br.Cam.:** Cam. Mt., 2,400–3,500 ft. (Mar., Apr.) *Maitland* 438 ! 1108 ! *Diestel* 149 ! Johann-Albrechtshöhe *Staudt* 483 ! Bambui, Bamenda, 4,000 ft. (fr. Apr.) *Maitland* 1633 ! Also in French Cameroons, Belgian Congo, Uganda and Angola. (See Appendix, p. 13.)

2. **C. kakoulimensis** *R. Schnell* in Bull. Soc. Bot. Fr. 96 : 223 (1949). A slender liane.
Fr.G.: Mt. Kakoulima, 2,000 ft. (fl. & fr. Feb.) *Schnell* 2461 !

3. **C. hirsuta** *Guill. & Perr.* Fl. Seneg. 1 (1830) ; Chev. Fl. Viv. 1 : 74 ; Turrill & Milne-Redhead l.c. 6. *C. thunbergii* Steud.—F.T.A. 1 : 6. *C. djalonensis* A. Chev. in Bull. Mus. Hist. Nat. 4 : 1010 (1932) ; Chev. Fl. Viv. 1 : 74. A climber, up to 20 ft., over trees and rocks, very common in savannah country.
Sen.: Cape Verde Peninsular *Leprieur.* **Gam.:** *Ingram* ! *Brown-Lester* 20 ! **Fr.Sud.:** Niayes (Dec.) *Chev.* 2536 ! **Fr.G.:** Rio Nunez *Heudelot* ! Labé (Nov.) *Chev.* 34545. **S.L.:** Musaia (Dec.) *Deighton* 4483 ! **G.C.:** Abofaw (Nov.) *Vigne* 3130 ! Kwahu Tafo (fr. Jan.) *Irvine* 1675 ! **Togo:** Kpedsu (Dec.) *Howes* 1048 ! **N.Nig.:** Sokoto, *Lely* 121 ! Patti Lokoja (Nov.) *Keay* FHI 28092 ! **S.Nig.:** Olokemeji *Foster* 143 ! Also widespread in most other parts of tropical Africa. (See Appendix, p. 12.)

4. **C. simensis** *Fres.*—F.T.A. 1 : 6 ; Turrill & Milne-Redhead l.c. *C. altissima* Hutch. in Kew Bull. 1923 : 180 ; F.W.T.A., ed. 1, 1 : 67 ; Chev. Fl. Viv. 1 : 74. A forest climber ; up to 120 ft. high.
Br.Cam.: Mt. Mba Kokeka, Bamenda, 6,700 ft. (Jan.) *Keay* FHI 28412 ! Cam. Mt., 3,000–8,000 ft. (Dec.–Jan.) *Mann* 1245 ! 2170 ! *Johnston* 28 ! 103 ! *Maitland* 247 ! 1230 ! *Diestel* 154 ! **F.Po:** Clarence Peak, 4,000–8,000 ft. (Nov.) *Mann* 576 ! Near Mioko (Jan.) *Guinea* 1878 ! Also in central and eastern tropical Africa, to Abyssinia and S. Rhodesia.

5. DELPHINIUM Linn.—F.T.A. 1 : 11.

Erect herb, shortly pilose with spreading hairs, sometimes glabrescent below, with few long-petiolate leaves ; radical leaves deeply 5-lobed, lobes irregularly incised, 5–12 cm. in diam., petiole up to 23 cm. long ; cauline leaves deeply 5-partite, segments irregularly lobed and incised ; racemes up to 7 cm. long, flowers about 1·5 cm. in diam., posterior sepal with a spur 4–5 mm. long containing the spurs of the two posterior petals ; fruit of 3 follicles, 12–14 mm. long .. .. *dasycaulon*

D. dasycaulon *Fres.*—F.T.A. 1 : 11 ; Turrill & Milne-Redhead F.T.E.A. Ranunc. 22. Erect herb, rather lax, to 4 ft. high, in grassland ; flowers bright blue.
S.Nig.: Mt. Koloishe, Obudu, 5,000–5,400 ft. (Dec.) *Keay & Savory* FHI 25081 ! **Br.Cam.:** above Bamenda, 8,000 ft. (Dec.–Jan.) *Migeod* 344 ! *Keay* FHI 28398 ! Widespread in central, east and south tropical Africa.

10. CERATOPHYLLACEAE

Aquatic submerged herbs with leafy floating branches. Leaves verticillate, variously divided with thread-like or linear segments. Flowers monoecious, solitary in the whorls, the males and females at separate nodes, sessile. Calyx thinly herbaceous, many-parted into narrow subvalvate segments often dentate or lacerate at the apex. Male flowers : stamens 10–22, crowded on a flat torus ; anthers almost sessile, erect, linear-oblong, 2-celled, cells parallel, opening lengthwise ; connective produced beyond the cells, thick and often coloured. Female flowers : staminodes 0 ; ovary sessile, ovoid, 1-celled ; style continuous with the ovary. Ovule 1, pendulous. Fruit a nut, ovoid or ellipsoid. Seed pendulous ; endosperm 0 ; embryo straight ; cotyledons oblong, equal ; radicle very short, the plumule already well developed and showing several leaves in the seed.

A well-marked family found in nearly all parts of the world.

CERATOPHYLLUM Linn.—F.T.A. 6, 2 : 326.

Characters of the family.

A glabrous perennial aquatic herb ; branches elongated, floating ; leaves in whorls of 5–12, more or less deeply divided into linear or filiform segments ; flowers small, axillary, sessile ; calyx-segments oblong ; fruit broadly ellipsoid, strongly warted and armed with 3 horns, about 5 mm. long without the horns .. .. *demersum*

C. demersum *Linn.*—F.T.A. 6, 2 : 326 ; Chev. Fl. Viv. 1 : 86, t. 17.
Sen.: *Perrottet* ! And various localities *fide* Chev. *l.c.* **Fr.Sud.:** *fide* Chev. *l.c.* **S.L.:** Mattru to Gbangbema *Deighton* 2339 ! **Dah.:** *fide* Chev. *l.c.* **S.Nig.:** Cradu L., Lagos *Barter* 3242 ! Okomu F.R. (fr. Dec., Jan.) *Brenan* 8498 ! 8769 !. Almost cosmopolitan.

Only a few fruiting specimens of this genus have been collected in West Africa, but when more adequate material is available it is possible that one or two additional species or varieties may be recognizable. The *Perrottet* specimen cited above is evidently an isotype of *C. cristatum* Guill. & Perr. (Fl. Seneg. 296), a species reduced to synonomy in the F.T.A. and by Chevalier (Fl. Viv. 1 : 86), but which may well prove distinct. A sterile specimen, collected by *T. Vogel* from the R. Niger in Nigeria, is possibly *C. submersum* Linn., a species not yet definitely recorded from tropical Africa.

11. NYMPHAEACEAE

Aquatic herbs with peltate or cordate leaves arising from a submerged prostrate rhizome. Flowers solitary, large and showy, often sweet-scented. Sepals 4–6, free or adherent to the receptacle. Petals numerous, imbricate, sometimes gradually passing into stamens. Anthers introrse, often flattened or petaloid, opening by a longitudinal slit. Carpels 8 or more, free and immersed in the receptacle or more or less united into an ovary of as many cells, inferior or semi-inferior. Receptacle large, fleshy, surrounding the ovary and with the petals and stamens inserted on its side. Ovules numerous, attached to the sides of the dissepiments. Fruit many-celled, indehiscent, fleshy. Seeds often arillate ; endosperm copious ; embryo minute, with thick cotyledons.

A small family found in both temperate and tropical regions of both hemispheres. Water-lilies, easily recognized by their aquatic habit, floating leaves, showy flowers, several petals sometimes passing gradually into the numerous stamens, the numerous carpels, and endospermous seeds with minute embryo.

NYMPHAEA Linn.—F.T.A. 1 : 52 ; Gilg in Engl. Bot. Jahrb. 41 : 351 (1908).

Rhizome perennial. Leaves deeply cordate with numerous radiating nerves. Sepals 4. Petals indefinite in 2 or more series. Stamens numerous, inserted with the petals on the side of the receptacle. Ovary many-celled, with radiating sessile stigmas. Seeds numerous, immersed in pulp.

Leaves with entire or slightly undulate margins, glabrous or nearly so beneath ; anther connective usually tapered at apex :

Leaves bearing a cluster of bulbils, arising at the top of the petiole from a hairy umbo ; lamina 10–17 cm. long, 8–12 cm. broad ; flowers about 10–12 cm. diam. when spread out ; young plants with smaller leaves and flowers ; connective of anther shortly produced, conical, terete .. .. 1. *micrantha*

Leaves not bearing bulbils ; hairy umbo absent :

Sepals up to 1 cm. broad and 4 cm. long ; petals about 5–10 ; flowers 3–8 cm. diam. ; leaves up to about 15 cm. long and 11 cm. broad ; nerves only slightly prominent beneath ; undersurface of leaves only slightly spotted .. .. 2. *maculata*

Sepals 1–2 cm. broad, 4–6 cm. long ; petals about 10–20 ; flowers 7–13 cm. diam. ; leaves up to about 22 cm. long and 19 cm. broad ; nerves rather prominent beneath ; undersurface of leaves usually rather heavily blotched and often reddish or purplish .. .. 3. *rufescens*

Leaves sharply toothed, with many strong nerves and usually hairy beneath ; lamina up to 30 cm. diam. ; anther-connective blunt and very shortly produced ; flowers up to 20 cm. diam. .. .. 4. *lotus*

1. **N. micrantha** *Guill. & Perr.* Fl. Seneg. 16 (1830) ; Conard Water-lilies 146, t. 9 (excl. syn. *N. rufescens* Guill. & Perr.) ; Gilg in Engl. Bot. Jahrb. 41 : 356 (1908) ; Chev. Fl. Viv. 1 : 93. *N. heudelotii* and *N. maculata* of F.W.T.A., ed. 1, 1 : 68, partly. The plant is viviporous from the second year ; leaves and flowers of young plants often much smaller than those of the parent ; petals white to bluish ; sepals spotted.
Sen.: *Perrottet. Roger*! *Brunner* 126! **Gam.:** *Sylvester*! *Brooks*! **Fr.Sud.:** Gourma (July) *Chev.* 24485! Gao (Sept.) *De Wailly* 4829! **S.L.:** Mambolo (Jan.) *Deighton* 974! Rokupr (Dec.) *Deighton* 4574! Rhombe Swamp (Mar.) *Adames* 150! **Lib.:** Ganta (May) *Harley*! **Iv.C.:** Baoulé *Chev.* 22393. **N.Nig.:** Sokoto (Oct.) *Dalz.* 352! Katagum *Dalz.* 200!

2. **N. maculata** *Schum. & Thonn.* Beskr. Guin. Pl. 247 (1827) ; Gilg l.c. 357 ; Chev. l.c. 94. *N. heudelotii* Planch.—F.W.T.A., ed. 1, 1 : 68 ; Chev. l.c. 95. Petals white, or pale whitish lilac or tinged pale blue at the tips.
Sen. & Fr.Sud.: *fide* Chev. *l.c.* **Fr.G.:** *Heudelot* 844! Kankan (Sept.) *Pobéguin* 1106! Conakry (Jan.) *Dalz.* 8142! **S.L.:** Luseniya Samu *Sc. Elliot* 4085! Waterloo (June) *Deighton* 2714! Moselolo to Sembehun (Nov.) *Deighton* 2392! Makeni to Kabala (Jan.) *King* 171*b*! **Lib.:** Monrovia (Nov.) *Linder* 1423! Bumbumi to Moala (Nov.) *Linder* 1349! **Iv.C.:** Abengourou *Chev.* 34091. **G.C.:** *Thonning*! Achimota (June) *Irvine* 1467! Tamale (Nov.) *Williams* 412! **Togo:** *Warnecke* 194! **N.Nig.:** Kontagora-Auna Road (Jan.) *Meikle* 1042! **S.Nig.:** Sapoba (Mar.) *Kennedy* 1791! *Jones* FHI 741!

3. **N. rufescens** *Guill. & Perr.* l.c. 15 (1830) ; Chev. l.c. 92 (excl. var. *bulbillifera* A. Chev. which is probably *N. micrantha* Guill. & Perr.). Petals bright blue, or sometimes white.
Sen.: *Roger* 4! **Gam.:** Kuntaur (Aug.) *Ruxton* 110! **N.Nig.:** near Jebba *Barter* 1037! 1064! Bida to Zungeru (Jan., May) *Meikle* 1027! *Keay* FHI 22846! Yola (Mar.) *Dalz.* 68! Baga Seyoram, L. Chad (Jan.) *Davey* FHI 27132!

4. **N. lotus** *Linn.*—F.T.A. 1 : 52 ; Conard l.c. 194, t. 16 ; Gilg l.c. 366 ; Chev. l.c. 1 : 89 (incl. var. *rogeoni* A. Chev., and var. *sinoensis* Stapf). *N. liberiensis* A. Chev. l.c. 1 : 92 (1938), French descr. only. Petals white ; flowers open from early evening until late morning.
Sen.: *Roger*! *Brunner* 123! **Gam.:** *Brooks* 61! **Fr.Sud.:** L. San (June) *Chev.* 1039! Bourem (July) *Chev.* 1314! **S.L.:** Njala (Aug.) *Deighton* 2785! Masuri (Mar.) *Glanville* 258! **Lib.:** Sinoe *Whyte*! Kakatown *Whyte*! Dukwia R. (Oct., Nov.) *Cooper* 16! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kumasi (Dec.) *Darko* 483! Tamale (Nov.) *Williams* 398! **Togo:** Kpedsu (Dec.) *Howes* 1075! **N.Nig.:** Nupe *Barter* 1071! Sokoto (Oct.) *Dalz.* 353! Kumu (Oct.) *Lely* 679! Musgu *E. Vogel* 74! **S.Nig.:** Lagos (Apr.) *Dalz.* 1261! Nun R. *Mann*! Sapoba *Richards* 3927! *Meikle* 554! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 477! **F.Po:** *Mann* 272! Also in north and central Africa, Egypt, Madagascar and in S.E. Europe, India and Malaya. (See Appendix, p. 13.)

12. MENISPERMACEAE[1]

Twining, or rarely erect shrubs or small trees, with the wood in cross-section showing broad medullary rays. Leaves petiolate, sometimes peltate, alternate, exstipulate, usually simple, rarely trifoliolate, or palmately lobed and nerved. Inflorescences cymose, paniculate, racemose, capitulate, fasciculate, or rarely the flowers solitary or geminate, axillary or borne on the leafless wood. Flowers small, inconspicuously coloured, unisexual, dioecious, actinomorphic, rarely slightly zygomorphic. Male flowers : sepals 3–12 or more, rarely 1, generally in series, or slightly connate, imbricate or rarely valvate, the outer smaller ; petals 1–6, usually in series, minute or absent, free, or rarely connate, usually imbricate ; stamens 3–6 or indefinite, rarely 2, when few opposite the sepals, free or variously united ; anthers short. Female flowers : sepals and petals as in male flowers ; staminodes present or absent ; carpels 3–6 or more, rarely 1, free, sessile or stipitate ; styles terminal or subterminal, rarely recurved ; stigma terminal, entire or lobed ; ovules 2, soon reduced to 1 by abortion, attached to the ventral suture. Fruiting carpels drupaceous, with the scar of the style subterminal or near the base by excentric growth, sessile or stipitate; exocarp membranous or subcoriaceous, mesocarp more or less pulpy, endocarp often chartaceous or bony, rugose, tuberculate or ribbed; seed often curved in the form of a horseshoe, with uniform or ruminate endosperm or without endosperm; embryo often curved, with a small radicle and flat or semi-terete cotyledons.

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[1] Revised in collaboration with G. Troupin of Brussels who is responsible for the description of the family, the keys to the genera, and the following genera : *Kolobopetalum, Rhigiocarya; Dioscoreophyllum, Syntriandrium, Jateorhiza, Tinospora, Chasmanthera, Sphenocentrum* and *Penianthus.*

Generally distributed throughout the tropics, with a few species in warm temperate regions, in tropical Africa mainly occurring in evergreen forest areas. Easily recognized by the structure of the wood, the usually twining habit, the alternate and exstipulate leaves, the unisexual small flowers often 3-merous, the stamens generally opposite the petals, the free carpels, and the often peculiar horseshoe-shaped fruit.

Key to plants with female flowers and fruits

Twiners:
 Leaves not peltate; carpels 3 or more:
  Inner sepals valvate; seeds generally without endosperm:
   Inner sepals connate:
    Condyle of the fruit present.. .. .. 1. **Synclisia**
    Condyle of the fruit absent .. .. 2. **Epinetrum**
   Inner sepals free:
    Carpels 3–5; style on the fruit minute; seeds almost annular 3. **Syrrheonema**
    Carpels 6–40:
     Surface of fruit glabrescent, smooth or rugose; petals well developed; sepals glabrous or nearly so .. .. 4. **Tiliacora**
     Surface of fruit velutinous or puberulous; petals minute or absent; sepals hairy 5. **Triclisia**
  Inner sepals imbricate; seeds always with endospermum:
   Flowers solitary or in fasciculate cymules; carpels 3; leaves up to 3 cm. long and 1·5 cm. broad .. .. 15. **Cocculus**
   Flowers numerous in more or less elongated and compound inflorescences; leaves much exceeding 3 cm. long and 1·5 cm. broad:
    Panicles of solitary flowers; endocarp of fruits echinate 6. **Kolobopetalum**
    Racemes of solitary flowers or of few-flowered cymules:
     Endocarp of fruit echinate.. .. .. 7. **Rhigiocarya**
     Endocarp of fruit not echinate:
      Carpels 1, villous; bracts enlarged in fruit; sepals 1 .. 14. **Cissampelos**
      Carpels 3–6, glabrescent or hirsute; bracts deciduous in fruit; sepals 3–6:
       Petals 0; flowers pedicellate, crowded in the upper part of the simple raceme; carpels 3–6 .. .. 8. **Dioscoreophyllum**
       Petals 6, rarely 3; flowers borne on the whole inflorescences:
        Staminodes absent; leaves glabrous, trifoliolate or simple, lobed or entire; carpels 3 .. .. 9. **Syntriandrium**
        Staminodes present:
         Leaves deeply lobed, hirsute; fruit bristly hirsute outside 10. **Jateorhiza**
         Leaves entire or angular, pubescent, tomentellous or glabrescent; outside of fruit pubescent or glabrescent:
          Petioles up to 3–8 cm. long; leaves 5–8 cm. long and broad, glabrescent or hispidulous on the nerves; racemes 5–10 cm. long .. 11. **Tinospora**
          Petioles 5–12 cm. long; leaves 8–20 cm. long and broad, tomentellous or pubescent; racemes 10–30 cm. long .. .. 12. **Chasmanthera**
 Leaves peltate; carpel solitary:
  Bracts minute, not enlarged in fruit; sepals 3–6; petals 2–4, free 13. **Stephania**
  Bracts conspicuous, membranous or leafy in fruit; sepals 1; petals 1–3, united into a cup .. .. 14. **Cissampelos**
Erect shrubs or small tree:
 Leaves heteromorphous, often pinnately lobed; carpels several (up to 20 ?) 16. **Sphenocentrum**
 Leaves not lobed; carpels 3 .. .. 17. **Penianthus**

Key to plants with male flowers

* Twiners:
 † Leaves not peltate:
  Inner sepals connate:
   Stamens 6–9, united only at the base .. .. 1. **Synclisia**
   Stamens 20–30 united in an elongated synandrium .. .. 2. **Epinetrum**

Inner sepals free :
Stamens free, or united only at the base :
Leaves membranous ; petioles twisted at the base :
Racemes up to 10 cm. long, composed of solitary flowers or few-flowered cymules 11. **Tinospora**
Panicles elongated and very slender, up to 40 cm. long .. 6. **Kolobopetalum**
Leaves not membranous ; petioles not twisted at the base :
Inner sepals imbricate ; flowers in axillary cymes ; sepals 6 ; petals 6 ; leaves up to 3 cm. long and 1·5 cm. broad .. .. 15. **Cocculus**
Inner sepals valvate ; inflorescences axillary or borne on the older wood ; sepals 6–18 ; petals 3–9, or absent :
Petals well developed ; sepals glabrous or nearly so .. .. 4. **Tiliacora**
Petals minute or absent ; sepals hairy .. .. 5. **Triclisia**
Stamens united :
Inner sepals valvate :
Inflorescence a fascicle of solitary flowers or of long-pedunculate 2–3-flowered congested cymules ; flowers subglobose, sepals hairy .. 3. **Syrrheonema**
Inflorescence a panicle of cymules ; flowers oblong ; sepals glabrous 4. **Tiliacora**
Inner sepals imbricate :
Petals absent ; flowers solitary on the axis of the raceme ; stamens united in an hemispherical synandrium .. .. 8. **Dioscoreophyllum**
Petals 3–6 ; flowers not solitary on the axis of the inflorescence :
Flowers sessile ; leaves deeply lobed and hispid .. .. 10. **Jateorhiza**
Flowers pedicellate :
Leaves glabrous :
Petals 3 ; leaves trifoliolate or simple, lobed or entire .. 9. **Syntriandrium**
Petals 6 :
Anthers opening by a semi-orbicular slit ; flowers in elongate very slender panicles up to 60 cm. long .. .. 6. **Kolobopetalum**
Anthers opening by a transverse slit ; flowers in short panicles up to 20 cm. or in racemes .. .. 7. **Rhigiocarya**
Leaves pubescent :
Petals 6, free ; sepals 6 ; petioles 8–12 cm. long ; racemes pendulous, elongated .. .. 12. **Chasmanthera**
Petals 1–3, united into a cup ; sepals 4 ; petioles up to 3 cm. long ; cymes crowded in fascicules or glomerules .. .. 14. **Cissampelos**
†Leaves peltate ; stamens united :
Sepals 6–8 ; petals 6, free .. .. 13. **Stephania**
Sepals 4 ; petals 1–3, united into a cup .. .. 14. **Cissampelos**
*Erect shrubs or small trees :
Leaves heteromorphous, often pinnately lobed ; sepals 6 ; petals 9 ; stamens 18–22 16. **Sphenocentrum**
Leaves not lobed ; sepals 6–10 ; petals 5–6 ; stamens 5–9 .. 17. **Penianthus**

1. SYNCLISIA Benth.—F.T.A. 1 : 49.

Liane with slender stems and leaves clothed with long, stiff, spreading hairs ; lower leaves sublanceolate, up to 20 cm. long ; upper leaves ovate-cordate, acuminate, 5–12 cm. long, 4–9 cm. broad ; petiole slender, 2–5 cm. long ; male flowers axillary, solitary or paired, on slender pedicels 8–25 mm. long ; female flowers unknown ; fruits ellipsoid, 12–17 mm. long, in dense clusters .. .. *scabrida*

S. scabrida *Miers*—F.T.A. 1 : 49 ; Diels in Engl. Pflanzenr. Menisp. 87 (excl. spec. *Sc. Elliot* 5751) ; Chev. Fl. Viv. 1 : 100 ; Troupin in Fl. Congo Belge 2 : 219 (1951). A slender liane of forest and regrowth ; flowers yellow.
S.Nig.: Eket *Talbot* 3332 ! **Br.Cam.:** Missellele, Tiko (Jan.) *Box* 3558 ! Also in French Cameroons, Gabon, Belgian Congo and Angola.

2. EPINETRUM Hiern in Cat. Welw. 1 : 21 (1896).

Stem and leaves quite glabrous ; leaves ovate-elliptic, cuneate to decurrent at base, obtusely long-acuminate, mucronate, 4·5–9 cm. long, 2–4·5 cm. broad, petiole 6–11 mm. long ; male flowers sessile in 1–3-flowered cymules subsessile in the axils of leaves ; inner united sepals glabrous outside, 6 mm. long ; female flowers and fruits unknown 1. *cuneatum*
Stem and leaves pilose or pubescent :
*Petioles up to 4 cm. long :
Inner united sepals glabrous outside ; male and female inflorescences in few-flowered axillary subsessile glomerules ; leaves obovate to ovate-elliptic or suborbicular, rounded at base, obtuse and mucronate or emarginate at apex, 2·5–8 cm. long, 1·5–4 cm. broad ; petiole up to 1 cm. long .. .. .. 2. *undulatum*

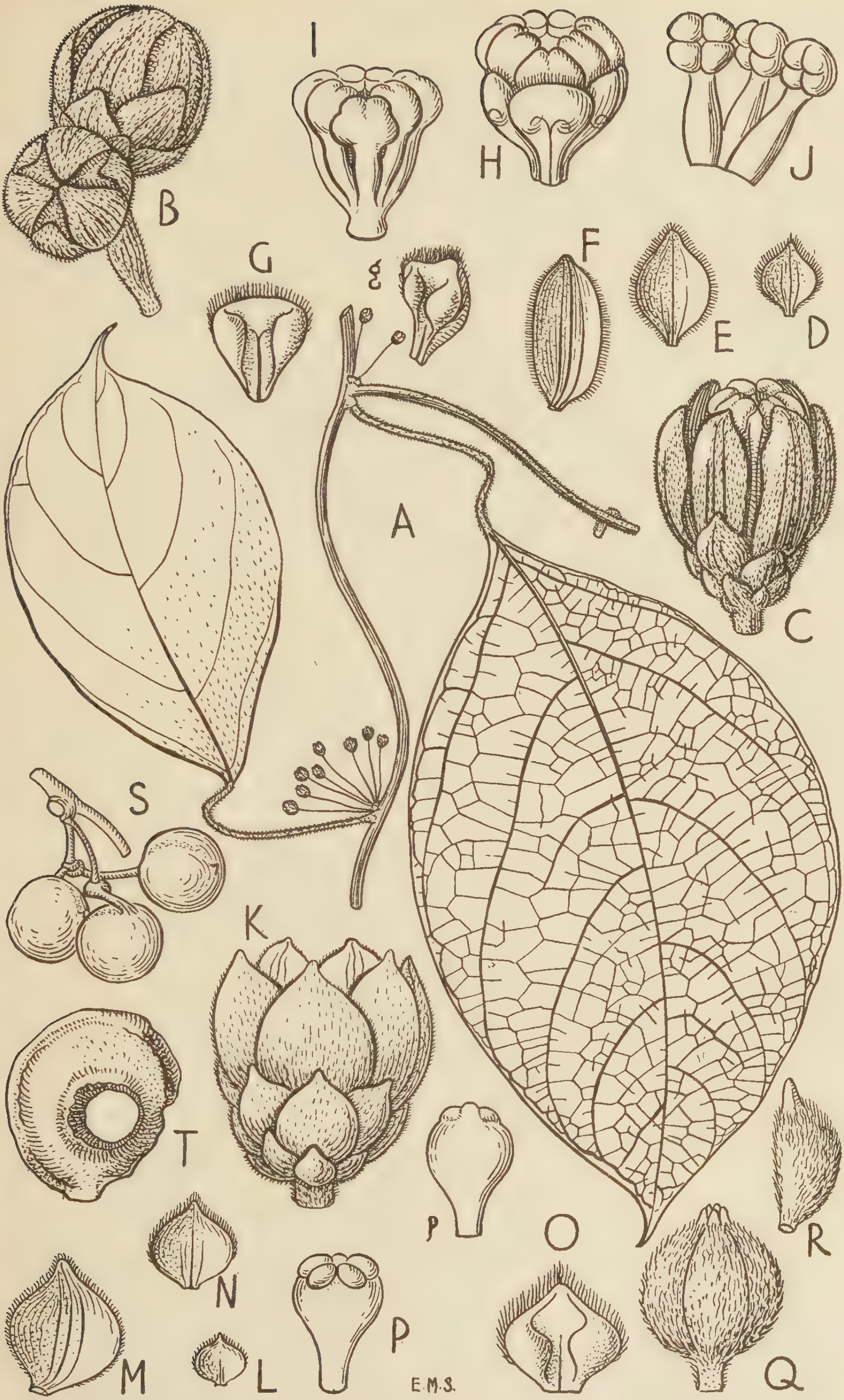

FIG. 18.—SYRRHEONEMA HEXASTAMINEUM *Keay* (MENISPERMACEAE).

A, leafy shoot and female inflorescences, × 2/3. B, male flower bud, × 10. C, male flower, × 10. D, E & F, male sepals, × 10. G & g, male petal, × 20. H, male petals and synandrium, × 20. I, synandrium, × 20. J, stamens, × 20. K, female flower, × 10. L, M & N, female sepals, × 10. O, female petal, × 20. P & p, staminodes, × 20. Q & R, carpels, × 20. S, fruits, × 1. T, endocarp, × 2.

A is drawn from *Box* 2602 ; B–J from *Box* 2413 ; K–R from *Box* 3248 ; S–T from *Box* 2739.

Inner united sepals setose-pubescent :

Leaves oblong-lanceolate to oblong-elliptic, not bullate, lamina more or less glabrous beneath except for the midrib which is hirsute with forward-spreading hairs, rounded to subcordate at base, obtuse to acute at apex, mucronate, 5–16 cm. long, 2·5–5·5 cm. broad ; petiole 1–2 cm. long .. .. .. 3. *scandens*

Leaves ovate-lanceolate, bullate, lamina densely hirsute beneath, the midrib densely hirsute with laterally spreading hairs, deeply cordate at base, gradually acuminate, 9–18 cm. long, 3–7 cm. broad, petiole 1–4 cm. long .. .. 4. *ferrugineum*

*Petioles 5–8 cm. long, leaves ovate to ovate-lanceolate, distinctly cordate at base, acute at apex, 8–15 cm. long, 5–8 cm. broad ; female flowers 1–2 in subsessile axillary cymules ; male flowers distinctly pedicellate, 2–5 together in lax axillary cymes .. .. 5. *cordifolium*

1. **E. cuneatum** *Keay* in Kew Bull. 1953 : 73. " Climbing among trees and undershrubs in xerophytic woods on hills near the coast."
G.C.: Yamoransa, Cape Coast (Mar., May) *Box* 2588 ! 2588*a* !

2. **E. undulatum** *Hiern* in Cat. Welw. 1 : 21 (1896) ; Diels in Engl. Pflanzenr. Menisp. 95, t. 34 ; Mangenot & Miège in Rev. Gen. Bot. 58 : 446 (1951). Low climber, flowers yellow.
Iv.C.: Sangouine forest, 20 miles W. of Man *Mangenot*. Also in Angola, Belgian Congo (?) and Uganda.

3. **E. scandens** *Mangenot & Miège* l.c. 442, t. 2 (1951). *Synclisia ferruginea* of Chev. Fl. Viv. 1 : 100, partly (*Pobéguin* 198). A climber of forest regrowth ; flowers pale yellow ; fruits with silvery hairs.
Iv.C.: Adiopodoumé (fl. Mar., Sept., fr. July) *Favarger* ; *Mangenot* ! Grand Bassam (Jan.) *Pobéguin* 198 ! Mid. Sassandra (fr. June) *Chev.* 19052 ! **G.C.:** Atabadi, Elmina (Feb.) *Box* 2441 ! 2442 !

4. **E. ferrugineum** (*Diels*) *Keay* l.c. 73 (1953). *Anisocycla ferruginea* Diels l.c. 92 (1910). *Synclisia ferruginea* (Diels) Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 70 (1927), partly (excl. *Chev.* 20989 & 21157) ; Kew Bull. 1927 : 154 ; Chev. Fl. Viv. 1 : 100, partly (excl. *Chev.* 20989 & 21157 which are *Chlamydocarya capitata* Baill. ; excl. *Pobéguin* 198 which is *E. scandens* Mangenot & Miège ; excl. *Chev.* 21134 which is sterile but clearly not *Menispermaceae*). *Synclisia scabrida* of Diels l.c. 87, partly, not of Miers. Liane.
S.L.: *Sc. Elliot* 5751 ! Njala (fl. Oct., Jan., fr. Mar.) *Deighton* 3120 ! 3231 ! 3231*a* ! Kenema (Jan.) *Thomas* 7630 ! 7685 ! **Lib.:** Grand Bassa (fr. Aug.) *Dinklage* 1686. Bushrod Isl. (Aug.) *Dinklage* 2844 !

5. **E. cordifolium** *Mangenot & Miège* l.c. 443, t. 1 (1951). Shrub, then climber ; common in forests and regrowth.
Iv.C.: Adiopodoumé (Sept.) *Mangenot*.

3. SYRRHEONEMA Miers—F.T.A. 1 : 50.

Petals absent ; male flowers with 3 stamens ; female flowers with 3 or 0 staminodes ; branches tomentose ; leaves rounded-ovate, slightly cordate or rounded at base, acutely acuminate, 7–11 cm. long, 7–9 cm. broad, softly tomentose beneath with simple and stellate hairs, becoming almost glabrous .. .. 1. *fasciculatum*

Petals 6 ; male flowers with 6 stamens ; female flowers with 6 staminodes ; branches puberulous, then glabrescent ; leaves elliptic, rounded to subacute at base, obliquely acute or acuminate at apex, 9–18 cm. long, 4·5–10 cm. broad, sparsely puberulous beneath .. .. 2. *hexastamineum*

1. **S. fasciculatum** *Miers*—F.T.A. 1 : 50 ; Diels in Engl. Pflanzenr. Menisp. 91 ; Troupin in Fl. Congo Belge 2 : 219 (1951). Climbing shrub, branches to 30 ft. ; flowers whitish.
F.Po: (Jan.) *Mann* 192 ! Also in French Cameroons, Gabon and Belgian Congo.

2. **S. hexastamineum** *Keay* in Kew Bull. 1953 : 75, t. 2. Slender woody climber of secondary forest growth ; flowers white, fruits deep red.
S.L.: Dodo (Apr.) *Deighton* 3909 ! **G.C.:** Asuansi (fl. Feb., Mar., July, fr. July) *Box* 2413 ! 2602 ! 2739 ! 3248 !

4. TILIACORA Colebr.—F.T.A. 1 : 43.

Stamens free or connate only at the base :

Stamens included, shorter than the inner larger whorl of petal-like sepals ; male inflorescence a narrow raceme with 1–2-flowered shortly pedunculate cymules :

Male flowers up to 2·5 mm. long ; inflorescence densely pubescent ; leaves elliptic, acutely long-acuminate, 7–18 cm. long, 3–6 cm. broad, 3–5-nerved at base 1. *dinklagei*

Male flowers 5–8 mm. long ; inflorescence glabrous or sparsely pubescent, on leafy shoots and cauliflorous ; female flowers in short few-flowered racemes ; carpels about 30 ; fruiting carpels obovoid, 8–12 mm. long, with stipes up to 7 mm. long ; leaves oblong-elliptic, long-acuminate, 8–12 cm. long, 3–5·5 cm. broad, 3-nerved at base.. .. .. 2. ? *odorata*

Stamens exserted ; male inflorescence paniculate, composed of pedunculate congested several-flowered cymules :

Leaves ovate, rounded to cordate at base, 4–8 cm. long, up to 6 cm. broad ; petioles about 2 cm. long ; male flowers about 4 mm. long ; fruits globose, 1–1·5 cm. in diam., obliquely stalked .. .. 3. *warneckei*

Leaves oblong-elliptic to ovate-elliptic, rounded at base, not cordate, 10–17 cm. long, 5–8·5 cm. broad ; petioles 1–2 cm. long ; male flowers about 5 mm. long ; fruits obovoid, about 1 cm. long, oblique and beaked at base.. .. 4. *johannis*

Stamens united at least to the middle ; male inflorescence paniculate with pedunculate several-flowered cymules :

Leaves cuneate at base, long-acuminate, acumen obtuse, oblong-elliptic to oblanceolate, 9–15 cm. long, 3–6 cm. broad, stamens 6–9 ; male inflorescence cauliflorous ; fruit unknown .. .. 5. *leonensis*

Leaves obtuse or rounded at base ; stamens 6 ; male flowers about 4 mm. long :

Petiole 2–2·5 cm. long, leaves ovate to ovate-oblong, 8–13 cm. long, 4–6 cm. broad, gradually acuminate ; inflorescences cauliflorous ; fruit obovoid about 7 mm. long 6. *lehmbachii*

Petiole up to 1·5 cm. long, leaves oblong, shortly acute, 9–20 cm. long, 4–7·5 cm. broad, 5-nerved at base, main nerves sculptured above ; inflorescences on leafy shoots or cauliflorous ; female flowers and fruits unknown .. 7. *dielsiana*

1. **T. dinklagei** *Engl.* Bot. Jahrb. 26 : 402 (1899) ; Diels in Engl. Pflanzenr. Menisp. 60 (excl. spec. *Whyte* ex Monrovia) ; Chev. Fl. Viv. 1 : 113. *Glossopholis dinklagei* (Engl.) Stapf in Johnston Lib. 576 (excl. spec. *Whyte*). Forest liane.
Lib.: Grand Bassa (fl. & fr. Apr.) *Dinklage* 1646 ! 1803 ! 2123 ! **Iv.C.:** *fide* Chev. *l.c.*

2. **T. ? odorata** *Engl.* l.c. 400 (1899) ; Diels l.c. 67. Climbing shrub in regrowth forest ; flowers yellow or green ; fruits golden-yellow.
S.L.: near Regent (fr. Dec.) *Sc. Elliot* 4017 ! Njala (fl. & fr. Oct.–Jan.) *Deighton* 2529 ! 2574 ! 2943 ! 3241 ! 4905 ! 5347 ! Rokupr (fl. & fr. Oct.) *Jordan* 140 ! 356 ! 366 ! Njama (fr. Mar.) *Deighton* 5363 ! **G.C.:** Asuansi (Feb., Apr.) *Box* 2411 ! 2674 ! Near Jukwa (fr. Mar.) *Box* 2577 ! [*T. odorata* Engl. is based on a single gathering from the French Cameroons which has somewhat smaller flowers than the material from our area.]

3. **T. warneckei** *Engl. ex Diels* l.c. 64 (1910) ; Chev. Fl. Viv. 1 : 111. Stout climbing or trailing liane ; sepals mauvish-brown ; ripe fruits orange, in coastal thickets.
G.C.: Anamabu (Jan.–May) *Box* 2216 ! 2698 ! 2699 ! Elmina (fr. Mar.) *Box* 2595 ! Achimota (Apr.) *Milne-Redhead* 5062 ! 5063 ! **Togo:** Lome (Aug.) *Warnecke* 221 ! (Nov.) *Mildbr.* 7505 ! (See Appendix, p. 15.)

4. **T. johannis** *Exell* in J. Bot. 73, Suppl. Polypet. 7 (1935). Large forest liane, cauliflorous, with flowers low down ; sepals cream.
S.Nig.: Olokemeji F.R. (July, Nov.) *Keay* FHI 14186 ! 22415 ! Shasha F.R. (fr. Jan.) *Tamajong* FHI 21051 ! Also in Cabinda.

5. **T. leonensis** (*Sc. Elliot*) *Diels* l.c. 67 (1910) ; Chev. Fl. Viv. 1 : 112. *Synclisia leonensis* Sc. Elliot (1894). Forest liane, flowers yellow.
S.L.: *Aylmer* 591 ! Kafogo, Limba *Sc. Elliot* 5537 ! Karene (Apr.) *Sc. Elliot* 5627 ! Between Bumban and Falaba (Apr.) *Sc. Elliot* 5670 ! **Iv.C.:** *fide* Chev. *l.c.*

6. **T. lehmbachii** *Engl.* l.c. 401 (1899) ; Diels l.c. 68 ; Troupin in Fl. Congo Belge 2 : 210 (1951). Forest liane with rather thick branches.
Br.Cam.: Buea, over 3,000 ft. (Nov.) *Lehmbach* 90 ! (fr. Jan.) *Maitland* 313 ! Also in Belgian Congo (?).

7. **T. dielsiana** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 71 (1927) ; Kew Bull. 1927 ; 155. *T. dinklagei* Engl. ex Diels l.c. 60, partly (*Whyte* s.n.). *Glossopholis dinklagei* (Engl.) Stapf l.c. 576, partly (*Whyte* s.n.). Stout forest liane ; flowers yellow.
S.L.: *Thomas* 9899 ! Kuntara (June) *Thomas* 465 ! Njala (May) *Deighton* 5051 ! **Lib.:** Monrovia *Whyte* !
G.C.: Amentia (Apr.) *Vigne* 2891 ! Asuansi (Mar.) *Box* 2554 ! Asenanyo River F.R. (Feb.) *Andoh* FH 4309 ! (See Appendix, p. 15.)

Imperfectly known species.

T.sp. Liane, flowers cream on leafless part of stem ; male flowers with 3 free stamens and 3 united stamens ; female flowers unknown ; leaves known only by fragment.
S.Nig.: Akure F.R. (Oct.) *Keay* FHI 25493 !

Excluded species.

T. trichantha Diels l.c. 63. Included in F.W.T.A., ed. 1, 1 : 71, but the only specimen cited is from the French Cameroons.

5. TRICLISIA Benth.—F.T.A. 1 : 48.

Inflorescence of male flowers laxly cymose, or fasciculate ; male flowers with 0–3 petals ; inner sepals in both sexes oblong to oblanceolate ; leaves usually much exceeding 10 cm. long, glabrous beneath except for midrib and main laterals, but sometimes shortly and sparsely pubescent when young :

Leaves deeply and widely cordate at base, ovate-oblong to suborbicular, rather abruptly acuminate, with on each side of midrib 2–3 main basal nerves and 2–3 other nerves :

Petiole, midrib and main nerves beneath densely pubescent ; leaves 20–25 cm. long, 10–18 cm. broad ; petals absent from male flower .. .. 1. *macrophylla*

Petiole, midrib and main nerves beneath very shortly puberulous to almost glabrous ; leaves up to 36 cm. long and broad ; petals 3 in male flower ; fruits ellipsoid, 4·5 cm. long, 3·5 cm. broad, in many bunches forming a very large infructescence 2. *gilletii*

Leaves shortly cuneate to subcordate at base, ovate to ovate-elliptic, triangular-acuminate, 10–18 cm. long, 6–12 cm. broad, with 3–4 main lateral nerves on each side of midrib ; petiole, midrib and main nerves beneath densely and shortly pubescent ; petals 0–3 in male flower .. .. 3. *patens*

Inflorescence of male flowers congested, subsessile, or capitate on a short peduncle ; male flowers congested, subsessile, or capitate on a short peduncle ; male flowers with 6 petals ; inner sepals in both sexes suborbicular ; leaves seldom exceeding 10 cm. long, pilose beneath, densely so when young :

Flowers with 9 small bract-like sepals, and 3 inner sepals 4–5 mm. diam. ; leaves stiffly papery, very variable in shape, suborbicular, oblong or ovate, rounded to deeply cordate at base .. .. 4. *subcordata*

Flowers with 15 small bract-like sepals, and 3 inner sepals about 2 mm. diam. ; leaves leathery, suborbicular .. .. 5. *coriacea*

1. **T. macrophylla** *Oliv.* F.T.A. 1 : 48 (1868) ; Diels in Engl. Pflanzenr. Menisp. 70 (1910). Climbing shrub, stems to 30 ft. long ; calyx and corolla of male flower green.
F.Po: (Jan.) *Mann* 197 !

2. **T. gilletii** (*De Wild.*) *Staner* in Inst. Roy. Col. Belge Bull. 4 : 430 (1933) ; Troupin in Fl. Congo Belge 2 : 215 (1951). *Tiliacora gilletii* De Wild. (1911). *Triclisia macrophylla* of Chev. Bot. 19 and of Fl. Viv. 1 : 115, not of Oliv. ; F.W.T.A., ed. 1, 1 : 72, partly. Massive liane, to 60 ft. high ; flowers mostly on old

wood below the leaves ; male flowers pale brown, in lax cymes ; female flowers dull orange in congested cymes ; ripe fruits bright orange in an enormous bunch.
Iv.C.: Grabo (fr. July) *Chev.* 19684. **G.C.:** Pra R., Ntronang (fr. Sept.) *Box* 2842 ! Pra-Anum F. R. (Jan.) *Box* 3108 ! **S.Nig.:** Omo F.R. (fr. Apr.) *Tamajong* FHI 16923 ! Okomu F.R. (Dec.–Feb.) *Brenan* 8570 ! 8809 ! 9108 ! **Br.Cam.:** L. Barombi, Kumba (Mar.) *Brenan* 9461 ! Missellele, Tiko (Jan.) *Box* 3559 ! Aso in Ubangi and Belgian Congo.

3. **T. patens** *Oliv.* F.T.A. 1 : 49 (1868) ; Diels l.c. 70 ; Chev. Fl. Viv. 1 : 114. Liane ; flowers yellow or orange ; fruit yellow in bunches, smaller than above.
Sen.: *Farmar* 152 ! **Fr.G.:** Conakry (June) *Debeaux* 424 ! **S.L.:** Bagroo R. (Apr.) *Mann* 797 ! Njala (Mar.) *Deighton* 1939 ! 4285 ! Talla Hills (Feb.) *Sc. Elliot* 3955 ! 4816 ! Layah (Jan.) *Sc. Elliot* 4660 ! Newton (Mar.) *Adames* 202 ! **Lib.:** Kakatown *Whyte* ! Grand Bassa (fl. May, fr. Sept.) *Dinklage* 1886 ! **G.C.:** Asuansi (fl. Jan., Feb., fr. Mar.) *Box* 2307 ! 2320 ! 2409 ! 2438 ! 2592 ! (See Appendix, p. 15.)

4. **T. subcordata** *Oliv.* F.T.A. 1 : 49 (1868) ; Diels l.c. 71 ; Chev. Fl. Viv. 1 : 116 ; Milne-Redhead in Kew Bull. 1950 : 261 (1951). *T. dielsii* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 72 (1927) ; Kew Bull. 1927 : 155. *Tiliacora subcordata* of Chev. Bot. 17. Slender woody twiner with brownish stems 6–15 ft. long ; flowers green, becoming brown ; fruits orange. (See Appendix, p. 15.)
G.C.: Cape Coast (Feb.) *Box* 2427 ! Anamabu (Jan., Mar.) *Box* 2217 ! 2562 ! Achimota (fl. Apr., fr. May) *Milne-Redhead* 5058*a* ! 5058*b* ! Akropong, Akwapim (fr. Aug.) *Irvine* 782 ! **Togo:** Lome *Warnecke* 327 ! Kadjebi, Jasikan (Mar.) *Box* 3440 ! **Dah.:** Abomey (Feb.) *Chev.* 23164. **N.Nig.:** Nupe *Barter* 1146 ! **S.Nig.:** Lagos *Dawodu* 223 ! Abeokuta *Barter* 3397 ! Ibadan (Apr.) *Keay* FHI 22539 ! Gambari F.R. (fr. Aug.) *Onochie* FHI 19149 ! Obu *Thomas* 377 !

5. **T. coriacea** *Oliv.* F.T.A. 1 : 49 (1868) ; Diels l.c. 71. Woody climber, 10–15 ft. long.
F.Po: *Mann* 174 !

Imperfectly known species.

T. sp. Slender woody twiner ; carpels numerous ; male flowers unknown.
S.Nig.: R. Oni, Omo F.R. (Feb.) *Jones* FHI 17554 !

6. KOLOBOPETALUM Engl. Bot. Jahrb. 26 : 410 (1899).

Leaves cordate at base :

Axis of male inflorescence elongated, to 60 cm. long, with relatively short lateral branches of which the lower ones are compound ; stamens 3–6 ; leaves elliptic to ovate, acutely or obtusely auriculate to rather widely cordate at base, caudate-acuminate, often remotely repand-dentate, 5–15 cm. long, 3·5–9 cm. broad, petioles 2–9 cm. long .. .. 1. *auriculatum*

Axis of inflorescence (male and female) abbreviated, much shorter than the lower branches, which are simple and up to 20 cm. long ; leaves elliptic, closely cordate at base, caudate-acuminate, 11–17 cm. long, 7–9 cm. broad, petioles 4–10 cm. long 2. *leonense*

Leaves rounded at base, not cordate ; ovate or ovate-elliptic, long-acuminate, 7–10 cm. long, 4–5·5 cm. broad, petioles 3–7 cm. long ; axis of inflorescence elongated, lower branches simple :

Stamens free, 1·5 mm. long ; inner sepals about 2·5 mm. long ; petals about 1 mm. long .. .. 3. *chevalieri*

Stamens connate, 1 mm. long ; inner sepals about 1·5 mm. long ; petals about 0·6 mm. long .. .. 4. *ovatum*

1. **K. auriculatum** *Engl.* Bot. Jahrb. 26 : 410 (1899) ; Diels in Engl. Pflanzenr. Menisp. 165, t. 56, 57. *K. exauriculatum* H. Winkl. (1908). *K. veitchianum* Diels l.c. 164 (1910) ; F.W.T.A., ed. 1, 1 : 73 ; Chev. Fl. Viv. 1 : 117. Lofty climber, petioles twining ; male flowers yellowish ; female flowers green.
G.C.: Asuansi (Apr.) *Box* 2650 ! Kakum F.R. (Apr.) *Box* 2631 ! **S.Nig.:** Ibadan (Mar.) *Keay* FHI 25695*a* ! Oban *Talbot* ! **Br.Cam.:** Victoria (Jan.–May) *Kalbreyer* 19 ! *Preuss* 1118 ! *Winkler* 525 ! Missellele, Tiko (Jan.) *Box* 3557 ! Also in French Cameroons and Gabon.

2. **K. leonense** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 73 (1927) ; Kew Bull. 1927 : 156 ; Dinklage in Fedde Rep. 41 : 249 (1937). A climbing shrub ; petioles twining ; flowers pink.
S.L.: *Thomas* 3858 ! **Lib.:** Gbanga (Sept.) *Linder* 578 ! Fayapulu (Oct.) *Linder* 1142 ! **G.C.:** Asuansi (fl. Sept., fr. Jan.) *Box* 2345 ! 2847 ! Amoabin, Jakkai (fr. Apr.) *Box* 2669 !

3. **K. chevalieri** (*Hutch. & Dalz.*) *Troupin* in Bull. Jard. Bot. Brux. 19 : 423 (1949). *Rhigiocarya chevalieri* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 70 (1927) ; Kew Bull. 1927 : 155 ; Dinklage l.c. ; Chev. Fl. Viv. 1 : 103. *K. ovatum* of Chev. Bot. 20, partly, not of Stapf. Flowers greenish-yellow ; fruits red when ripe.
Lib.: Peáhtah (fr. Oct.) *Linder* 986 ! Morris' farm (May) *Dinklage* 3047 ! **Iv.C.:** Soubré (fr. May) *Chev.* 16404 ! Taté, Tepo (Aug.) *Chev.* 19810 ! Lower Cavally, To (Aug.) *Chev.* 19846 ! Guidéko (fr. May) *Chev.* 16463 ! Also in Ubangi and Belgian Congo.

4. **K. ovatum** *Stapf* in J. Linn. Soc. 37 : 82 (1905) ; Diels l.c. 164 ; Chev. Bot. 20, partly ; Chev. Fl. Viv. 1 : 118 ; Dinklage l.c. A glabrous climbing shrub.
Lib.: Sinoe Basin *Whyte* ! Fishtown (May) *Dinklage* 1882. **Iv.C.:** Soubré (June) *Chev.* 19140. Man to Zagoue (May) *Chev.* 21551. **Togo:** Misahöhe (fl. Apr.) *Baumann* 487. Also in Ubangi and Belgian Congo (?).

7. RHIGIOCARYA Miers in Ann. Nat. Hist. Sér. 3, 14 : 100 (1864).

A glabrous liane ; branchlets slender, with long internodes ; leaves broadly ovate, openly cordate at base, abruptly acutely acuminate, 7–18 cm. long, 6–16 cm. broad, thinly papery, entire, about 7-nerved at base ; petiole up to 9 cm. long, twisted at base ; male inflorescences axillary, in racemes or panicles, up to 18 cm. long ; pedicels nearly 1 cm. long ; fruits ellipsoid, 1·5 cm. long, 1 cm. broad .. .. *racemifera*

R. racemifera *Miers*—Diels in Engl. Pflanzenr. Menisp. 160, t. 55 ; Chev. Bot. 16. *Chasmanthera ? nervosa* Miers—F.T.A. 1 : 41. *Miersiophyton nervosum* (Miers) Engl. (1899). *Rhigiocarya nervosa* (Miers) Chev. Fl. Viv. 1 : 103. Large liane ; lower part of stem warty ; flowers greenish or yellowish-white.
S.L.: *Afzelius* ! Bagroo R. (Apr.) *Mann* 888 ! Yonibana (Oct.-Nov.) *Thomas* 4791 ! 5019 ! Joru, Gaura (Oct.) *Deighton* 5217 ! 5218 ! Mano (fr. Nov.) *Deighton* 2431 ! Kenema (fl. & fr. Jan.) *Thomas* 7539 ! 7577 ! **Lib.:** Peáhtah (Oct.) *Linder* 896 ! 1051 ! Gbanga (Sept.) *Linder* 651 ! **Iv.C.:** widespread *fide* Chev. *l.c.* **G.C.:** Kumasi *Cummins* 122 ! Huniso (fr. Jan.) *Irvine* 1065 ! Akwascho, Khahu (Jan.) *Irvine* 1673 ! Foso-Juaso F.R. (July) *Box* 2765 ! **Dah.:** Sakete (Jan.) *Chev.* 22838 **S.Nig.:** Epe *Barter* 3315 (partly) ! Sunmoge (Jan.) *Richards* 3007 ! Ibadan (Jan.) *Meikle* 952 ! **Br.Cam.:** *Maitland* 314*b* ! Also in French Cameroons, Gabon and Cabinda. (See Appendix, p. 14.)

8. **DIOSCOREOPHYLLUM** Engl. Pflanzenwelt Ost-Afr. C. 81 (1895).

Flowers with synandrium sessile or slightly stipitate, stipe thick, up to 1 mm. long ; leaves entire or irregularly dentate or about 3–5-lobed ; stems, inflorescences, and sometimes leaves, with dark rusty bristly hairs .. .. .. 1. *cumminsii*

Flowers with synandrium distinctly stipitate, stipe slender up to 2 mm. long ; leaves as above :

Stems, inflorescences, and sometimes leaves, with scattered pale hairs, not bristly 2. *tenerum* var. *tenerum*

Stems, inflorescences, and sometimes leaves with dark rusty bristly hairs 2a. *tenerum* var. *fernandense*

1. **D. cumminsii** (*Stapf*) *Diels* in Engl. Pflanzenr. Menisp. 181, t. 64 a–f (1910), partly ; Chev. Fl. Viv. 1 : 108. *Rhopalandria cumminsii* Stapf (1898). *D. strigosum* Engl. (1899). *D. klaineanum* Pierre ex Diels (1910), partly. *Rhopalandria lobatum* C. H. Wright (1908). *D. lobatum* (C. H. Wright) Diels (1910) ; F.W.T.A., ed. 1, 1 : 71, partly ; Chev. Fl. Viv. 1 : 110. *D. cumminsii* (C. H. Wright) Diels var. *lobatum* (C. H. Wright) Troupin. A high climber, leaves very variable in shape ; flowers green with yellow anthers ; fruit red ; in forest.

Fr.G.: Kouyeyo (July) *Maclaud* 220 ! R. Kolente (July) *Pobéguin* 772 ! **S.L.:** Limba (Apr.) *Sc. Elliot* 5633 ! Sendugu (June) *Thomas* 562 ! Pendembu (July) *Thomas* 719 ! Masasa (Sept.) *Jordan* 323 ! Njala (fl. June, fr. Aug.) *Deighton* 3239 ! 3240 ! **Lib.:** Betwa (Dec.) *Bunting* 90 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** (fr. July) *Johnston* 102 ! Kumasi *Cummins* 230 ! Begoro (Apr.) *Irvine* 1189 ! Bremang, Jukwa (Mar.) *Box* 2575 ! Asuansi (Feb.) *Box* 2410 ! **Togo:** Misahöhe (fl. May) *Baumann* 557. **S.Nig.:** Ibadan (Sept.) *Newberry* 71 ! Gambari group F.R. (Apr.-Aug.) *Keay* FHI 16240 ! **Br.Cam.:** *fide* Diels *l.c.* Also in French Cameroons, Gabon, Ubangi, Belgian Congo and A.-E. Sudan.

2. **D. tenerum** *Engl.* var. **tenerum**—Diels l.c. 181. Chev. Fl. Viv. 1 : 108. *D. lobatum* of F.W.T.A., ed. 1, 1 : 71, partly, not of (C. H. Wright) Diels. A slender twiner ; leaves entire or lobed ; flowers yellow ; fruits red.

S.L.: *Afzelius* ! Pujehun to Fwendu *Deighton* 1730 ! Njala (fl. May, June, fr. Oct.) *Deighton* 2429 ! 2523 ! 2523*b* ! Rokupr (June, Aug.) *Jordan* 62 ! 273 ! Rowala (July) *Thomas* 1210 ! Makump (July) *Thomas* 921 ! **Lib.:** Ganta *Harley* ! **Iv.C.:** basin of Upper Nuon (Apr.) *Chev.* 21146 ! Also in Cabinda and Tanganyika Territory.

2a. **D. tenerum** *Engl.* var. **fernandense** (*Hutch. & Dalz.*) *Troupin* **stat. nov.** *D. fernandense* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 71 (1927). *D. klaineanum* Pierre ex Diels, partly. *D. podandrium* Exell in J. Bot. 75 : 165 (1937). Climbing plant, 6 ft. high, calyx green.

S.Nig.: Nikrowa (Mar.) *Ross* 107 ! **F.Po:** (June) *Mann* 416 !

9. **SYNTRIANDRIUM** Engl. Bot. Jahrb. 26 : 412 (1899).

Leaves simple or trifoliolate, lobed or entire, cordate or obliquely auriculate at base ; male inflorescences in very long and slender panicles up to 150 cm. long ; stamens 3, connate ; female inflorescences in elongated racemes .. .. .. *preussii*

S. preussii *Engl.* Bot. Jahrb. 26 : 412, t. 14 (1899) ; Diels in Engl. Pflanzenr. Menisp. 158, t. 53 & 54 ; Troupin in Fl. Congo Belge 2 : 233. *S. cordatum* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 73 (1927) ; Kew Bull. 1927 : 156. *S. dinklagei* Engl.—Diels l.c. 158. *S. edentatum* Engl. ex Diels l.c. 158. A glabrous climbing shrub ; male flowers greenish-yellow, soon falling off.

S.Nig.: Okomu F.R. (Feb.) *Brenan* 9102 ! Eket *Talbot* 3136 ! Calabar *Williams* 28 ! Oban *Talbot* 1423 ! s.n. ! **Br.Cam.:** between Victoria and Bimbia (May) *Preuss* 1273 ! Victoria (July) *Maitland* 374 ! Also in French Cameroons, Gabon and Belgian Congo.

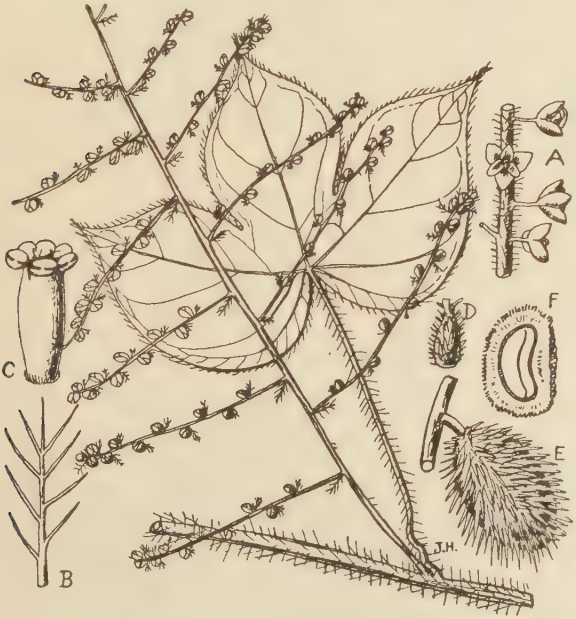

Fig. 19.—Jateorhiza macrantha (*Hook. f.*) *Exell & Mendonça* (Menispermaceae).

A, portion of male inflorescence.

B, bract of female flower.

C, staminal column.

D, ovary.

E, fruit.

F, longitudinal section of seed.

10. **JATEORHIZA** Miers—F.T.A. 1 : 41.

A climber, with stems, petioles and leaf-margins clothed with stiff hairs ; leaves up to 20 cm. in diam., digitately 3–5-lobed up to the middle, deeply cordate, lobes acutely acuminate, papery, reticulate, setose only on the nerves ; petiole up to 20 cm. long ; male flowers in lax panicles, sessile on the lateral branchlets ; panicles over 30 cm. long ; female flowers in simple racemes with conspicuous laciniate deciduous bracts ; fruit ovoid, 2·5 cm. long, echinate .. .. *macrantha*

J. macrantha (*Hook. f.*) *Exell & Mendonça* in J. Bot. 73, Suppl. Polypet. 10 (1935). *Cocculus macranthus* Hook. f. (1848). *J. strigosa* Miers (1849)—F.T.A. 1 : 42 ; Diels in Engl. Pflanzenr. Menisp. 167, t. 59; F.W.T.A., ed. 1, 1 : 72. Liane to 30 ft. high, with stiff brown hairs ; flowers cream ; fruits with stiff brown hairs.
S.Nig.: Ibadan (Apr.) *Meikle* 1405 ! Akinjare, Owo (Apr.) *Jones* FHI 3120 ! Okomu F.R. (fl. & fr. Dec., Jan.) *Brenan* 8445 ! 8480 ! Oban *Talbot* 449 ! 1328 ! Afi River F.R. (Dec.) *Keay* FHI 28247 ! **Br.Cam.**: Victoria (Feb.) *Maitland* 412 ! R. Mungo, Missellele (fl. & fr. Jan.) *Box* 3574 ! 3575 ! 3576 ! Barombi (fl. & fr. June) *Preuss* 355. **F.Po**: (fr. Jan.) *Mann* 193 ! (fr. June) *Barter* ! Clarence Cove (Oct., Nov.) *T. Vogel* 37 ! Also in French Cameroons, Gabon, Belgian Congo and Cabinda. [Two sterile specimens from the Gold Coast (*Bowdich* s.n. and *Williams* 709) may also be this plant.]

11. **TINOSPORA** Miers—F.T.A. 1 : 43.

A slender glabrous twiner ; older branches lenticellate ; leaves broadly ovate, widely cordate at base, shortly acuminate, 5–8 cm. long and broad, thinly papery, glabrous, digitately 7-nerved at base ; petiole 3–8 cm. long, slender ; male inflorescences axillary, racemose, slender, up to 9 cm. long ; pedicels fasciculate, 3–5 mm. long ; flowers about 5 mm. in diam. .. .. *bakis*

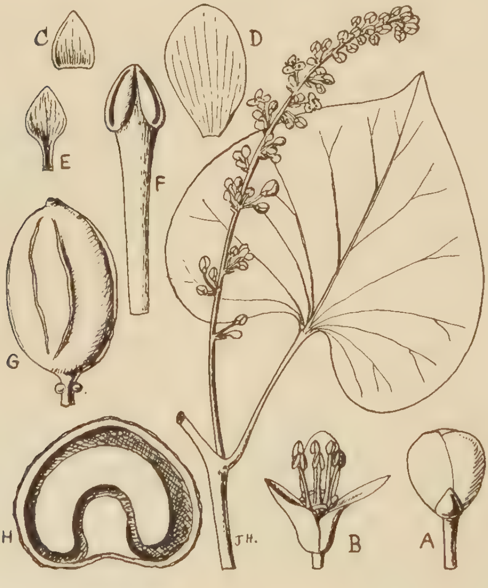

FIG. 20. — TINOSPORA BAKIS (*A. Rich.*) *Miers* (MENISPERMACEAE).
A, flower-bud.
B, male flower.
C, outer sepal.
D, inner sepal.
E, petal.
F, stamen.
G, fruit.
H, cross-section of fruit.

T. bakis (*A. Rich.*) *Miers*—F.T.A. 1 : 43 ; Diels in Engl. Pflanzenr. Menisp. 140 ; Chev. Fl. Viv. 1 : 101. *Cocculus bakis* A. Rich. in Guill. & Perr. Fl. Seneg. 12, t. 4. Twiner with perennial rootstock ; in dry regions ; flowers yellow-green.
Sen.: *Richard* ! *Perrottet* 10 ! Walo *Heudelot* ! **Fr.Sud.**: Macina (Sept.) *Chev.* 24902. Zinder (Nov.) *Hagerup* 617 ! Sango-Bandiagara (fr. July) *De Granay* 74 ! Gao (fl. Mar., fr. Mar., Apr.) *De Wailly* 4978 ! 5036 ! Near Timbuktu (fl. & fr. Sept.) *Chudeau* ! **N.Nig.**: Katagum (Jan.) *Dalz.* 323 ! Also in Mauritania and extending to Abyssinia and Tanganyika. (See Appendix, p. 15.)

12. **CHASMANTHERA** Hochst.—F.T.A. 1 : 40.

Liane ; young stems softly pubescent ; leaves broadly ovate to suborbicular, widely cordate at base, long-mucronate at apex, up to 20 cm. long and broad, thinly papery, entire or shortly 3–7-repand-lobate, the lobes mucronate, thinly pilose on both surfaces, about 7-nerved at base ; petioles 5–12 cm. long ; inflorescences very slender, drooping, axillary, pubescent, up to 30 cm. long ; bracts linear, 4–5 mm. long ; pedicels clustered, about 5 mm. long, fruits ellipsoid, about 1 cm. long .. *dependens*

C. dependens *Hochst.*—F.T.A. 1 : 41 ; Diels in Engl. Pflanzenr. Menisp. 152 ; Chev. Fl. Viv. 1 : 104. Liane of forest margins, and in savannah especially by rocks ; sometimes planted ; bark papery, exfoliating ; flowers greenish-yellow ; ripe fruits scarlet.
S.L.: Waterloo (May) *Deighton* 2264 ! King Tom, Freetown (May) *Deighton* 1175 ! **G.C.:** *Farmar* 509 ! Mampong (May) *Box* 3205 ! 3206 ! Furnso (fr. May) *Box* 3202 ! **Togo:** Kadjebi, Jasikan (Mar.) *Box* 3239 ! **Dah.:** Savalou (May) *Chev.* 23713. Atacora Mts. (June) *Chev.* 24036 ! **N.Nig.:** Nupe *Barter* 1728 ! 1731 ! Anara F.R. (May) *Keay* FHI 22871 ! Gayo, Kano (July) *Daggash* FHI 22396 ! Yola (June) *Dalz.* 79 ! **S.Nig.:** Lagos *Rowland* ! *Dalz.* 1137 ! Ibadan South F.R. (fl. Apr., fr. June) *Keay* FHI 22843 ! Extends to Abyssinia and Kenya. (See Appendix, p. 13.)

13. STEPHANIA Lour.—F.T.A. 1 : 46.

Inflorescences 4–7 cm. in diam., composed of pseudo-umbels on a single peduncle up to 10 cm. long, solitary or fasciculate in the axils of leaves ; leaves ovate to orbicular-ovate, acute, 5–10 cm. long, 4–13 cm. broad, entire, petiole 4–12 cm. long :
  Plant glabrous .. .. 1. *abyssinica* var. *abyssinica*
  Plant densely pubescent .. .. 1a. *abyssinica* var. *tomentella*
Inflorescences elongated, up to 50 cm. long with a single main axis which bears numerous lateral racemes or pseudo-umbels, in leaf axils or on older leafless branches :
  Plant hispid, with long stiff brown hairs ; inflorescence up to 50 cm. long, usually axillary, with shortly stalked lateral branches diminishing in size from base to apex, clothed with short appressed curly white hairs as well as sparse brown setæ ; leaves broadly ovate or orbicular, 12–25 cm. long, 10–20 cm. broad, mucronate, margin crenulate, ciliate, petiole 8–15 cm. long .. .. .. 2. *laetificata*
  Plant glabrous ; inflorescence up to 50 cm. long, usually on older wood, main axis with long-stalked lateral branches bearing pseudo-umbels, upper branches as long as lower ; leaves ovate to suborbicular, 7–15 cm. in diam., acute, margin undulate, petiole 6–12 cm. long .. .. 3. *dinklagei*

1. **S. abyssinica** (*Dill. & Rich.*) *Walp.* var. **abyssinica**—F.T.A. 1 : 47 ; Diels in Engl. Pflanzenr. Menisp. 268 ; Chev. Fl. Viv. 1 : 125. *Clypea abyssinica* Dill. & Rich. (1840). Slender liane, to 30 ft. high, leaves dark green above, glaucous beneath, flowers green or purple.
Fr.G.: Labé (Apr.) *Chev.* 12300 ! Ladedeperre (Apr.) *Chev.* 12335. **Br.Cam.:** Cam. Mt., 4,400–7,800 ft. (Dec.–Apr.) *Mann* 1242 ! 2169 ! *Maitland* 1112 ! *Hutch. & Metcalfe* 19 ! *Brenan* 9526 ! **F.Po:** Moka, crater lake, 6,000 ft. (Jan.) *Exell* 816 ! Widely spread in tropical Africa. (See Appendix, p. 15.)

1a. **S. abyssinica** var. **tomentella** (*Oliv.*) *Diels* l.c. 270 (1910). *S. hernandifolia* var. *tomentella* Oliv. in Trans. Linn. Soc. 2 : 328 (1887). As above, but densely pubescent.
Br.Cam.: Bali-Ngemba F.R., Bamenda (May) *Ujor* FHI 30322 ! Widespread in central and east Africa.

2. **S. laetificata** (*Miers*) *Benth.* in Benth. & Hook. f. Gen. Pl. 1 : 962 (1867) ; F.T.A. 1 : 47 ; Diels l.c. 262 ; Chev. Fl. Viv. 1 : 124. *Perichasma laetificata* Miers (1866). Slender liane, to 30 ft. high, calyx green, corolla white.
S.Nig.: Owena, Ondo *Box* 3522 ! Sapoba *Kennedy* 2179 ! Calabar *Robb* ! Oban *Talbot* 594 ! s.n. ! **Br.Cam.:** Victoria (Jan.) *Deistel* 142. R. Mungo, Missellele (Jan.) *Box* 3577 ! Buea (Mar.-May) *Lehmbach* 54 ; 118. Barombi (Apr.) *Preuss* 275. Extends southwards to Angola.

3. **S. dinklagei** (*Engl.*) *Diels* l.c. 265 (1910) ; Chev. Fl. Viv. 1 : 126. *Cissampelos dinklagei* Engl. (1899). Liane, to 60 ft. high, with warty rope-like stems ; leaves dark glossy green above, glaucous beneath with purplish veins ; flowers greenish ; peduncle and pedicels in fruit brilliant scarlet, fruits green, yellowish when ripe, seed black.
Fr.G.: Kindia (Mar.) *Chev.* 13075. **S.L.:** Tassin, R. Scarcies (Jan.) *Sc. Elliot* 4495 ! Kamalu (May) *Thomas* 324 ! Njala (fl. Apr., fr. June) *Deighton* 2602 ! 2905 ! 3732 ! **Lib.:** Bonuta (Oct.) *Linder* 921 ! Dukwia R. (May) *Cooper* 434 ! **Iv.C.:** Bouroukrou (Dec.–Jan.) *Chev.* 16659. Diambarakou (Mar.) *Chev.* 17703. **G.C.:** Asuansi (fl. & fr. Mar.) *Box* 2525 ! 2547 ! **Togo:** Misahöhe (fr. Apr.) *Baumann* 521. Amedjofe (Mar.) *Box* 3438 ! **S.Nig.:** Shasha F.R. (Apr.) *Richards* 3372 ! Oban *Talbot* 593 ! Ikorodu (Mar.) *Schlechter* 12306. **Br.Cam.:** Buea *Lehmbach* 199 ; *Mildbr.* 3466. Also in French Cameroons, Congo and Angola.

14. CISSAMPELOS Linn.—F.T.A. 1 : 45.

Leaves peltate, suborbicular, usually repand-lobate, lobes mucronate, thin, thinly pubescent or glabrescent beneath, 5–11 cm. broad ; male inflorescence elongate, very slender ; female with large membranous bracts .. .. .. 1. *owariensis*
Leaves not or only slightly peltate, entire, thickly papery, softly tomentose beneath, up to 8 cm. broad ; male inflorescence short, corymbose, female with small leafy bracts .. .. 2. *mucronata*

1. **C. owariensis** *P. Beauv. ex DC.*—Diels in Engl. Pflanzenr. Menisp. 302 ; Chev. Fl. Viv. 1 : 128. *C. pareira* Linn. var. *owariensis* (P. Beauv. ex DC.) Oliv. F.T.A. 1 : 46. *C. robertsonii* Exell in J. Bot. 64 : 192 (1926). A twiner ; mainly in secondary growth in forest regions ; female inflorescence, with greenish-white bracts, and red fruits.
Iv.C.: various localities *fide* Chev. *l.c.* **G.C.:** Cape Coast *Brass* ! Aburi (Oct.) *Brown* 338 ! Assuantsi (Mar.) *Irvine* 1554 ! **Togo:** Kpandu *Robertson* 27 ! 81 ! **Dah.:** Allada (Mar.) *Chev.* 23401 ! **S.Nig.:** Lagos *Barter* 20156 ! Ijaye *Barter* 3345 ! Ibadan South F.R. (fr. Apr.) *Keay* FHI 22542 ! Calabar (fl. Apr., fr. July) *Holland* 41 ! 119 ! Eket *Talbot* 3313 ! Oban *Talbot* 489 ! **Br.Cam.:** Victoria (Apr.) *Maitland* 635 ! **F.Po:** *Mann* 180 ! Extends to N. Rhodesia and Angola. (See Appendix, p. 13.)

2. **C. mucronata** *A. Rich.*—Diels l.c. 300 ; Chev. Fl. Viv. 1 : 127. *C. pareira* of F.T.A. 1 : 45, partly. A twiner over shrubs in savannah regions ; flowers greenish, fruits red, root thickened.
Sen.: *Perrottet* 12 ! Walo *Heudelot* ! Dakar (May) *Baldwin* 5747 ! **Fr.Sud.:** Bandiagra (fr. Sept.) *Chev.* 24929 ! Kabarah *Hagerup* 306 ! **Fr.G.:** Boké *Maclaud.* **S.L.:** Charlotte (June) *Deighton* 2712 ! **Iv.C.:** frequent *fide* Chev. *l.c.* **G.C.:** Achimota (June) *Irvine* 572 ! Passankwia, White Volta R. (May) *Kitson* ! **Togo:** Lome *Warnecke* 263 ! 338 ! **Dah.:** *fide* Chev. *l.c.* **N.Nig.:** Nupe *Barter* 854 ! Kukawa (May) *E. Vogel* 76 ! Bauchi Plateau (Jan.) *Dent Young* 3 ! *Lely* 15 ! P. 42 ! Abinsi *Dalz.* ! Widespread in drier parts of tropical Africa. (See Appendix, p. 13.)

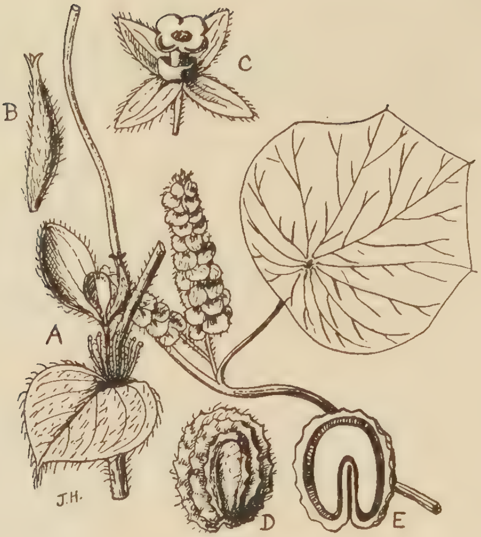

FIG. 21. — CISSAMPELOS OWARIENSIS *P. Beauv. ex DC.* (MENISPERMACEAE).

A, portion of female inflorescence.
B, ovary.
C, male flower.
D, seed.
E, seed in longitudinal section.

15. COCCULUS DC.—F.T.A. 1 : 44.

A prostrate or straggling and climbing shrub ; branches elongate, slender, glabrous ; leaves variable, entire or obscurely lobed, ovate to lanceolate, 1·5–3 cm. long, 0·5–1·5 cm. broad, subglaucous, glabrous ; male flowers in axillary fascicles, female solitary or paired ; pedicels slender ; fruits subglobose, about 6 mm. in diam., red, often pruinose .. .. *pendulus*

C. pendulus (*J. R. & G. Forst.*) *Diels* in Engl. Pflanzenr. Menisp. 237, t. 78, 0 (1910) ; Chev. Fl. Viv. 1 : 98. *Epibaterium pendulum* J. R. & G. Forst. *C. leaeba* (Del.) DC.—F.T.A. 1 : 44. For full synonymy see Diels l.c.
Sen.: Walo *Heudelot* ! *Perrottet* 11 ! **Fr.Sud.:** Kabara (July, Aug.) *Chev.* 1559 ! **N.Nig.:** Kukawa (Jan.) *E. Vogel* 29 ! Bure, L. Chad (fr. Dec.) *Elliott* 114 ! Also in Cape Verde Islands, Mauritania and Sahara ; extends to Angola, Abyssinia and Arabia. (See Appendix, p. 14.)

16. SPHENOCENTRUM Pierre in Bull. Soc. Linn. Paris 1 : 79 (1898).

Erect shrub ; branchlets glabrous ; leaves variable on the same shoot, obovate-elliptic and entire or pinnately lobed, both apex and lobes acuminate, 12–20 cm. long, 5–12 cm. broad, glabrous ; lateral nerves about 6, the basal pair marginal ; petiole sulcate, 2–7 cm. long, conspicuously bent and thickened at apex, tumid at base ; flowers in axillary clusters, yellowish-white ; fruit ovoid-ellipsoid, about 2 cm. long, up to 1·5 cm. broad, puberulous .. .. *jollyanum*

S. jollyanum *Pierre*—Diels in Engl. Pflanzenr. Menisp. 99, t. 36 ; Chev. Fl. Viv. 1 : 121. Sparingly branched evergreen, shrub or treelet, to 4 ft. high ; flowers cream, fruits bright orange ; abundant in forest undergrowth.
Iv.C.: Dabou (fl. & fr. May) *Jolly* 132 ! Guidéko and env. (Jan., May, June) *Chev.* 16383 ; 19081. Bouroukrou (Dec., Jan.) *Chev.* 16810 ; 16760. Abengourou *Chev.* **G.C.:** Akwapim Hills (fr. Apr.) *Irvine* 1150 ! Kwahu Prasu (Feb.) *Vigne* 1605 ! **Dah.:** various localities *fide* Chev. *l.c.* **S.Nig.:** Ibadan (fr. Mar.) *Meikle* 1258 ! Epe *Barter* 3290 ! Sapoba (fr. May) *Kennedy* 1381 ! Annye, Benin (fr. Sept.) *Unwin* 138 ! Nikrowa (Dec.) *Brenan* 8479 ! (See Appendix, p. 15.)

17. PENIANTHUS Miers—F.T.A. 1 : 50.

Lateral nerves raised on upper surface ; male flowers cymose, pedicellate ; leaves generally obovate-oblanceolate, long-cuneate to obtuse at base .. .. 1. *zenkeri*
Lateral nerves impressed on upper surface ; male flowers glomerate, subsessile ; leaves variable in shape, cuneate to subrotundate at base .. .. 2. *longifolius*

1. **P. zenkeri** (*Engl.*) *Diels* in Engl. Pflanzenr. Menisp. 101, t. 37, A–K (1910). *Heptacyclum zenkeri* Engl. (1899). *P. patulinervis* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 74 (1927) ; Kew Bull. 1927 : 156 ; Dinklage in Fedde Rep. 41 : 249 (1937) ; Chev. Fl. Viv. 1 : 122. A small tree or shrub, to 20 ft. high, in forest ; male flowers pale yellowish, female greenish ; fruit orange.
S.L.: Kememe (fr. Jan.) *Thomas* 7650*a* ! 7991 ! Heirakohun *Smythe* 100 ! **Lib.:** Peahtah (fr. Oct.) *Linder* 1067 ! **Iv.C.:** frequent between Cavally and G.C. border (fl. & fr. Jan.–Apr.) *fide* Chev. *l.c.* ; *Aubrév.* 1516 ! 1518 ! **G.C.:** Kumasi (fr. Jan.) *Cummins* 169 ! 190 ! Amentia (Mar.) *Irvine* 445 ! *Vigne* 1895 ! **S.Nig.:** Oban (fr. Jan.) *Talbot* 1358 ! Obompa (fr. Jan.) *Thomas* 2218 ! **Br.Cam.:** L. Barombi, Kumba (Jan.–Mar.) *Preuss* 49 ; *Staudt* 535 ; *Brenan* 9462 ! 9463 ! Also in French Cameroons. (See Appendix, p. 14.)
2. **P. longifolius** *Miers*—F.T.A. 1 : 50 ; Diels l.c. 101, t. 37, L–P : Chev. Fl. Viv. 1 : 123 ; Troupin in Fl. Congo Belge 2 : 253 (1951). *P. fruticosus* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 74 (1927) ; Kew Bull.

1927 : 157. A small tree or shrub, to 15 ft. high, in forest ; male flowers cream, female brown-red ; fruit red.
S.Nig.: Oban *Talbot* 1444 ! **Br.Cam.:** Cam. Mt., 500 ft. (Jan.) *Mann* 1205 ! S. Bakundu F.R. (fr. Mar.) *Brenan* 9482 ! Kumba (fr. Sept.) *Rosevear* 99/37 ! R. Metschum falls, Bamenda (Jan.) *Keay* FHI 28530 ! **F.Po:** (fl. Jan., fr. June) *Mann* 194 ! *Barter* ! Also in French Cameroons, Ubangi, Spanish Guinea, Gabon and Belgian Congo.

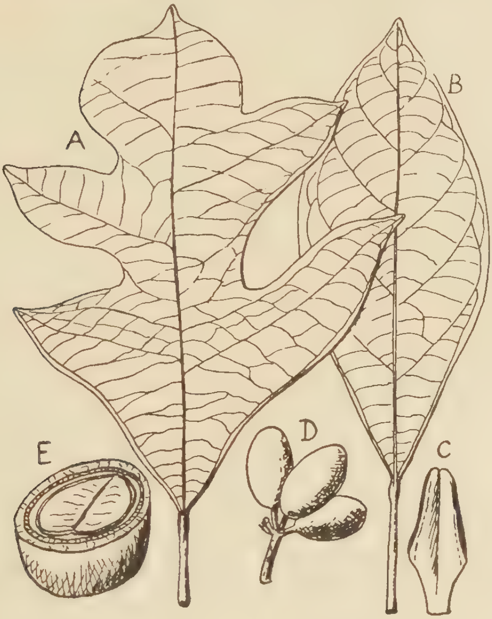

FIG. 22. — SPHENOCENTRUM JOLLYANUM *Pierre* (MENISPERMACEAE).
A, B, leaves.
C, stamen.
D, fruit.
E, fruit in cross-section.

13. ARISTOLOCHIACEAE

Climbing shrubs, or rarely dwarf and erect ; stems of the woody species in cross-section showing broad medullary rays ; roots often medicinal. Leaves petiolate, alternate, exstipulate, simple, mostly entire. Flowers solitary or racemose, axillary or in clusters on the older wood, pedicellate, hermaphrodite, zygomorphic or rarely actinomorphic. Perianth single, often enlarged and petaloid, variously produced above the ovary, often tubular, the limb either symmetrically 3-lobed, or unilateral and entire or lobed, usually highly coloured and foetid. Stamens 6–∞, in 1–2 series around the apex of the ovary or stylar column ; filaments short, thick, free or scarcely distinguishable from the column ; anthers free or adnate, with 2 parallel cells, extrorse, opening longitudinally. Ovary inferior or rarely semi-superior, 4–6-celled or imperfectly celled ; styles thick, short, united into a column, divided into 3–8 stigmatic lobes ; ovules numerous in each cell. Fruit capsular or rarely indehiscent, sometimes dehiscing from the base upwards and hanging like an inverted parachute. Seeds numerous, often immersed in the pulpy endocarp, 3-sided or flattened, raphe sometimes thickened or winged ; endosperm copious, fleshy ; embryo small.

Generally distributed throughout the tropics and warm temperate regions, with a few species in the cooler parts of the North Temperate Zone especially. Easily recognized by the structure of the wood, the usually climbing habit, the hermaphrodite flowers with often (*Aristolochia*) enlarged and petaloid single perianth, and usually capsular fruit with triquetrous or flattened seeds.

Fruit indehiscent, elongated, strongly ribbed, cucumber-like ; perianth regular, 3-lobed, or zygomorphic with 3 or 1 long tails dependent from the mouth of the limb ; 6–12 stigmatic lobes ; 6–24 anthers ; flowers mostly on old woody stems below the leaves **1. Pararistolochia**

Fruit dehiscent, short, basket-like ; perianth irregular, oblique with a single lobe or bilabiate with a broad standard and long keel ; stigmatic lobes 6 or less, anthers 6 or less ; flowers on leafy shoots .. .. 2. **Aristolochia**

1. PARARISTOLOCHIA Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 75 (1927); Kew Bull. 1928 : 22 ; Keay in Kew Bull. 1952 : 159.

Perianth lobes with intermediate very small lobes ; leaves not known .. 1. *ju-ju*
Perianth without intermediate lobes :
 *Perianth regularly 3-lobed :
  †Leaves cuneate, rounded or very slightly cordate at base, not lobed and not deeply cordate :
   Perianth tube about 2 cm. long, only slightly pouched at base ; lobes triangular, hardly 1 cm. long, almost forming a triangle in open flower ; flowers on leafy shoots ; leaves ovate, acuminate, 8–11 cm. long, 4–7 cm. broad, very laxly veined .. .. 2. *leonensis*
   Perianth tube at least 4 cm. long, flowers on older wood :
    Perianth lobes triangular to lanceolate without long slender tails :
     Perianth lobes ovate-lanceolate to lanceolate, at least 4 cm. long and twice as long as broad, tapering to a fine point :
      Perianth tube about 4 cm. long, only slightly pouched at base, more or less straight ; lobes lanceolate, about 4 cm. long ; leaves oblong-ovate, 15 cm. long, 9 cm. broad .. .. 3. *tribrachiata*
      Perianth tube 5–8 cm. long, conspicuously pouched at base and curved ; lobes ovate-lanceolate, 2–3·5 cm. broad, 5–8 cm. long ; leaves ovate-elliptic, 7–14 cm. long, 6–9·5 cm. broad ; fruits to 60 cm. long and 3 cm. diam., hexagonal in section .. .. 4. *flos-avis*
     Perianth lobes triangular, 2–2·5 cm. long, 1·2–2 cm. broad, reflexed ; lower swollen part of tube 2·5–3 cm. long, 1·5–1·8 cm. broad, upper part about 3·5 cm. long ; leaves oblong-elliptic, abruptly acuminate, 7–11 cm. long, 5–6·5 cm. broad ; fruit 15 cm. or more long, 3 cm. broad, 6-grooved with rounded ridges .. .. 5. *zenkeri*
    Perianth lobes triangular about 1·2 cm. long and broad, with slender tails up to 4 cm. long ; pouch about 2 cm. long and 1·5 cm. diam. ; tube curved, about 3·5 cm. long ; leaves oblong-elliptic, cuneate, abruptly acuminate, 11–16 cm. long, 4·5–8 cm. broad .. .. 6. *preussii*

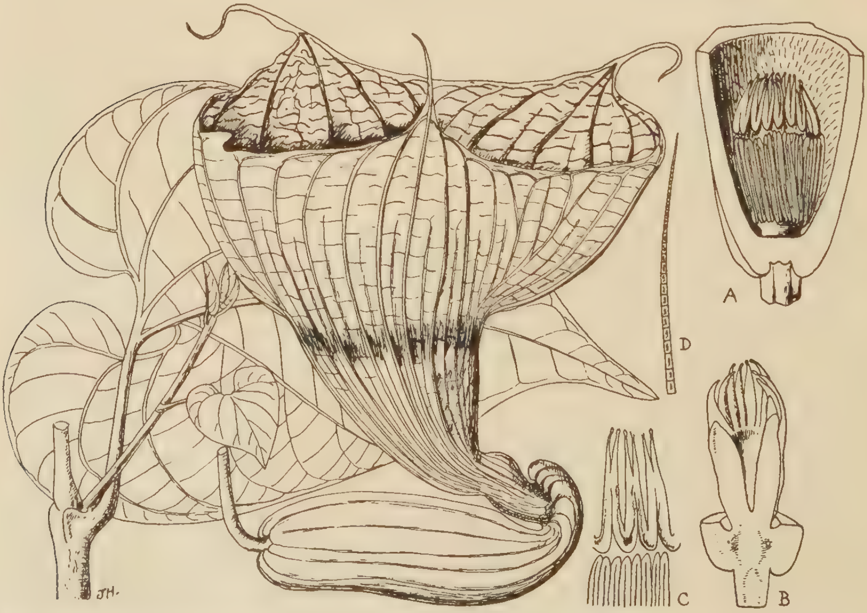

FIG. 23.—PARARISTOLOCHIA GOLDIEANA (*Hook. f.*) *Hutch. & Dalz.* (ARISTOLOCHIACEAE).

A, lower portion of perianth with side cut away to show stamens and stigmatic lobes. B, vertical section of stylar column with stigmatic lobes. C, anthers and stigmatic lobes. D, hair from within the lower part of the perianth.

†Leaves deeply cordate at base :

Leaves not lobed, broadly rounded-ovate, abruptly acuminate, up to about 15 cm. long and broad ; perianth limb very large and spreading with 3 linear tails ; basal portion of tube about 18 cm. long and 4–5 cm. wide, with well-marked ribs 7. *goldieana*

Leaves shallowly 3-lobed, deeply cordate-auriculate, 12–15 cm. long, 9–12 cm. broad ; perianth tube about 8 cm. long with large pouch at base ; fruit about 25 cm. long, 3–4 cm. diam., with 6 angular ridges .. .. .. 8. *triactina*

*Perianth irregularly lobed :

Perianth with short rounded lobes, two of the lobes being longer than the third thus making the mouth of the tube 2-lipped ; pouch about 2·5 cm. long and 1·5 cm. broad ; slightly oblique limb about 6 cm. long ; leaves 3–5-lobed closely and deeply cordate at base, auricles sometimes overlapping, glabrous .. 9. *mannii*

Perianth with 1–3 long tails arising from one side of the mouth of the tube :

Perianth gradually tapered into 3 long tails (to 45 cm.) ; perianth tube at maturity 8–11 cm. long ; leaves oblong-elliptic acuminate, chartaceous when mature, 8–13 cm. long, 3·5–5·5 cm. broad, 3-nerved at base .. .. .. 10. *promissa*

Perianth abruptly narrowed into the long tails ; perianth tube up to 8 cm. long at maturity ; leaves not known :

Flower with a single tail about 10 cm. long ; perianth tube 4·5–5 cm. long, about 1 cm. broad in the middle when flattened out ; pedicels about 3 cm. long 11. *talbotii*

Flower with 3 thread-like tails about 20 cm. long ; perianth tube 8 cm. long, about 1·5 cm. broad in the middle when flattened out .. .. 12. *tenuicauda*

1. **P. ju-ju** (*S. Moore*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew Bull. 1928 : 23. *Aristolochia ju-ju* S. Moore in J. Bot. 58 : 269 (1920). A twiner ; bark rugose with lenticels ; flowers rather large, inflated part of perianth 3 cm. long, 2–2·5 cm. diam., tube 7 cm. long.

S.Nig.: Degema *Talbot* 3766 !

2. **P. leonensis** (*Mast.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew Bull. 1928 : 24. *Aristolochia leonensis* Mast. in J. Linn. Soc. 30 : 95 (1894). A stout twiner, often with warty bark ; flowers comparatively small ; petioles twisted and twining.

S.L.: near Kassa, 3,600 ft. (Mar.) *Sc. Elliot* 5062 ! Falaba (Mar.) *Sc. Elliot* 5401 !

3. **P. tribrachiata** (*S. Moore*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew Bull. 1928 : 24. *Aristolochia tribrachiata* S. Moore in Cat. Talb. 92 (1913). Stem twining, stout, fissured ; inflorescence with a thickly wooded base ; flowers yellowish-white, lobes reddish-purple with white streaks.

S.Nig.: Oban *Talbot* 213 ! 1542 !

4. **P. flos-avis** (*A. Chev.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew. Bull. 1928 : 24 ; Chev. Fl. Viv. 1 : 132. *Aristolochia flos-avis* A. Chev. in Journ. de Bot. 1909 : 129. *A. tessmannii* Engl. Bot. Jahrb. 46 : 413 (1911). A stout forest liane, to 100 ft. high, with rough channelled bark, and twining petioles ; perianth tube greenish to yellowish-white outside with very numerous purple spots, lobes deep purple.

S.L.: Commendi-Gengaru Road (Nov.) *Aylmer* 622 ! **Iv.C.:** Guidéko (May) *Chev.* 17786 ! 16434. Between Sampleu and Ganhoue (Apr.) *Chev.* 21145. **G.C.:** *Gould* ! Pamu Berebun F.R. (fl. & fr. Sept.) *Vigne* 2492 ! **S.Nig.:** Omo F.R. (fl. & fr. Feb., Apr.) *Ross* 40 ! *Jones & Onochie* FHI 17301 ! *Richards* 3125 ! Oban *Talbot* 213 ! **Br.Cam.:** Kumba (fl. & fr. Nov.) *Dundas* FHI 8498 ! Also in French Cameroons and Spanish Guinea.

5. **P. zenkeri** (*Engl.*) *Hutch. & Dalz.* in Kew Bull. 1928 : 24. *Aristolochia zenkeri* Engl. Bot. Jahrb. 24 : 490 (1898). Forest liane, to 30 ft. high, stems rough ; perianth tube pale brown outside, lobes deep purple-brown with many small white spots, and white hairs ; white within with long hairs ; fruit green.

S.Nig.: Okomu F.R. (Dec.) *Brenan* 8467 ! Also in French Cameroons.

6. **P. preussii** (*Engl.*) *Hutch. & Dalz.* in Kew Bull. 1928 : 24. *Aristolochia preussii* Engl. l.c. 492 (1898). Forest liane, to 30 ft. high, outside of perianth tube and lobes pale dull brown with dull purple markings, throat deep purple.

Br.Cam.: Barombi, between the station and Kumba (Apr.) *Preuss* 108. S. Bakundu F.R. (Mar.) *Brenan* 9484 ! [*Preuss* 108, the type was a poor leafless specimen and was presumably destroyed at Berlin in the war ; Brenan's excellent specimen collected in the same district agrees well with Engler's description, except for the pedunculate flowers and longer internodes in the well-developed cymes of *Brenan* 9484.]

7. **P. goldieana** (*Hook. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew Bull. 1928 : 25 ; Chev. Fl. Viv. 1 : 135. *Aristolochia goldieana* Hook. f.—F.T.A. 6, 1 : 142 ; Bot. Mag. t. 5672. A climber, 20 ft. long with very large reddish-purple flowers up to 18 in. long ; fruits several inches long with six well-marked ribs.

S.L.: Port Loko (Apr.) *Sc. Elliot* 5747 ! Pendembu *Sc. Elliot* 5682 ! Njala (July) *Deighton* 2907 ! **G.C.:** near Kibbi (Mar.) *Vigne* 4374 ! **N.Nig.:** forests near Lokoja *Elliott* 250 ! **S.Nig.:** Ijaiye F.R. (Apr.) *Onochie* FHI 21984 ! Lagos *Carter* ! Elugu *Barter* 3427 ! Oban *Talbot* 2340 ! Old Calabar *Thomson* ! **F.Po:** (May) *Mann* 391 ! Also in French Cameroons. (See Appendix, p. 16.)

8. **P. triactina** (*Hook. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 77 (1927) ; Kew Bull. 1928 : 24 ; Chev. Fl. Viv. 1 : 134. *Aristolochia triactina* Hook. f.—F.T.A. 6, 1 : 140. *A. schweinfurthii* Engl. Bot. Jahrb. 24 : 492 (1898). A woody climber, 25 ft. or more long, with pendulous cucumber-like fruits ; perianth-lobes red-purple, tube paler.

Dah.: Zagnanado *Chev.* 23296. Tori-Avamé (July) *Poisson.* **S.Nig.:** Lagos (Mar.) *Moloney* 18 ! *Dalz.* 1076 ! Itu (Mar.) *Holland* 26 ! Also in Gabon, A.-E. Sudan, Uganda and Angola.

9. **P. mannii** (*Hook. f.*) *Keay* in Kew Bull. 1952 : 159. *Aristolochia mannii* Hook. f.—F.T.A. 6, 1 : 140 ; F.W.T.A., ed. 1, 1 : 77. Woody climber 10–15 ft. long ; flowers dark violet with yellowish spots ; fruit long, 6-ridged.

Iv.C.: Adiopodoumé *Favarger.* **S.Nig.:** Old Calabar (Feb.) *Mann* 2323 ! *Thomson* 69 ! Bonny (fl. & fr. Feb.) *Kalbreyer* 62 !

10. **P. promissa** (*Mast.*) *Keay* l.c. 160, t. 1 (1952). *Aristolochia promissa* Mast.—F.T.A. 6, 1 : 142 ; F.W.T.A., ed. 1, 1 : 78. *A. flagellata* Stapf—F.T.A. 6, 1 : 141 ; F.W.T.A., ed. 1, 1 : 77. *A. talbotii* var. *longissima* S. Moore in Cat. Talb. 94 (1913). *A. congolana* Hauman in Fl. Congo Belge 1 : 384 (1948), French descr. only. Woody climber, flowers on old stems freely almost from ground to the top ; to 30 ft. high, in forest. Outside of flower dirty yellow to greenish-white with purplish brown blotches ; inside yellow, brown-spotted, with white hairs ; fruit with 6 rounded ridges, to 6 in. long.

G.C.: Aburi Hills (Oct.) *Johnson* 487 ! Aburi Gardens (Nov.) *Johnson* 1060 ! Kwahu Prasu (Feb.) *Vigne* 1606 ! 1607 ! Bunsu, Akim (Mar.) *Irvine* 1806 ! **S.Nig.:** Oban *Talbot* 1642 ! **Br.Cam.:** Victoria (Jan.) *Kalbreyer* 7 ! Barombi (Mar.) *Preuss* 45 ! Also in French Cameroons and Belgian Congo.

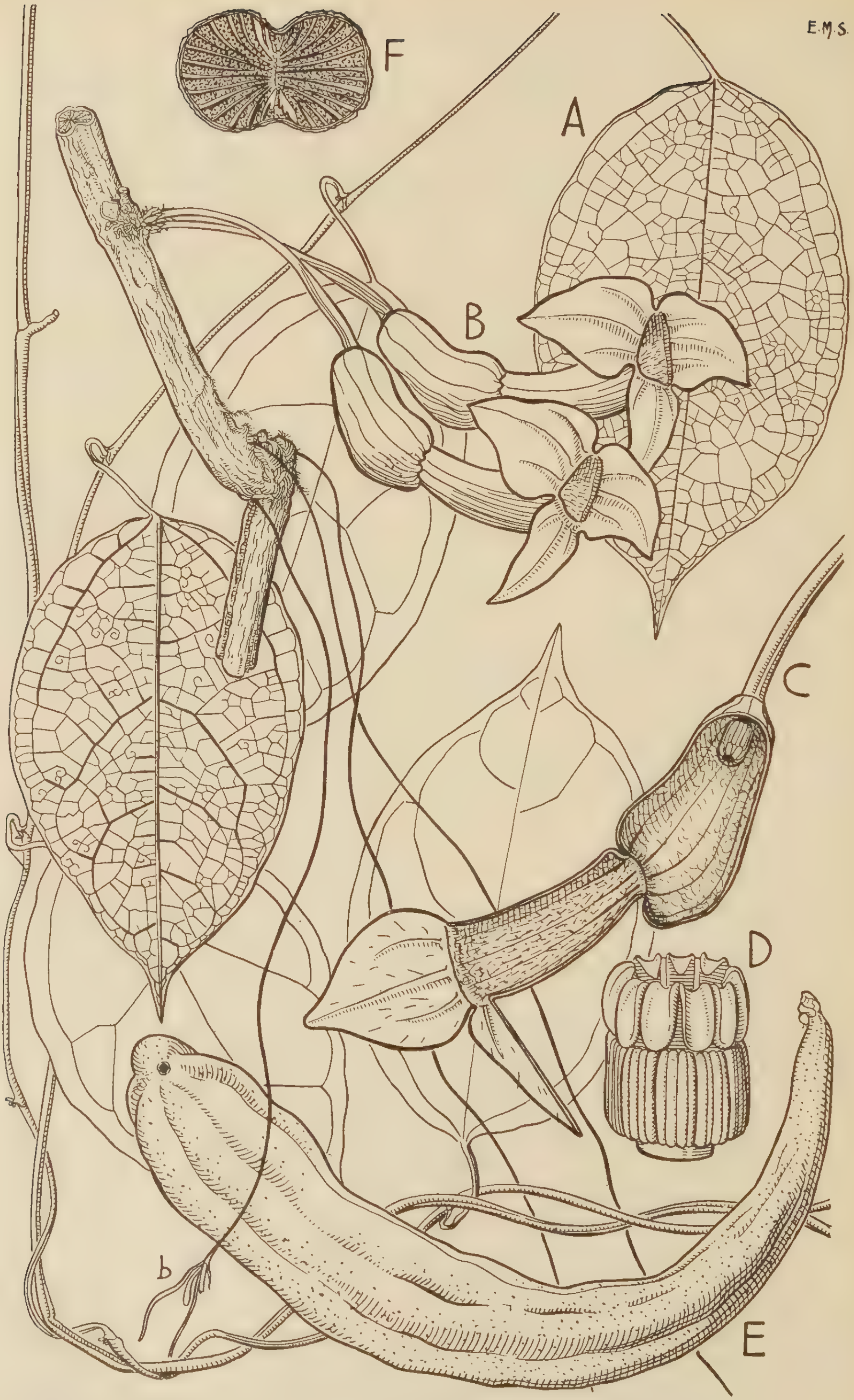

Fig. 24.—Pararistolochia zenkeri (*Engl.*) *Hutch. & Dalz.* (Aristolochiaceae).
A, leafy shoot, × 2/3. B, inflorescence, × 2/3. C, longitudinal section of perianth, × 1. D, stigmatic lobes and anthers, × 4. E, fruit, × 2/3. F, transverse section of stem, × 1. Drawn from *Brenan* 8467.

11. **P. talbotii** (*S. Moore*) *Keay* l.c. 161 (1952). *Aristolochia talbotii* S. Moore in Cat. Talb. 93, t. 11 (1913) (excl. var. *longissima*) ; F.W.T.A., ed. 1, 1 : 78. Perianth pale-yellowish-green with black-bulbous-based hairs within.
S.Nig.: Oban *Talbot* 128 ! 2310 !

12. **P. tenuicauda** (*S. Moore*) *Keay* l.c. 160 (1952). *Aristolochia tenuicauda* S. Moore l.c. 94 ; F.W.T.A., ed. 1, 1 : 78. Colour of outside of perianth not recorded ; inside with white hairs.
S.Nig.: Oban *Talbot* 2318 !

2. ARISTOLOCHIA Linn.—F.T.A. 6, 1 : 135.

Perianth lobes not forming a keel-like lip and broad standard; flowers subtended by a leafy bract :
  Perennial herb, stems flexuous ; flowers solitary in the leaf axils ; older leaves not very reticulate ; fruits about 2·5 cm. long .. .. .. 1. *bracteolata*
  Shrubby climber ; stems twining ; flowers racemose ; older leaves markedly reticulate ; fruits about 5–6 cm. long .. .. 2. *albida*
Perianth lobes consisting of a keel-like lip up to 17 cm. long and a standard about 4 cm. diam. on a claw about 3·5 cm. long ; tube consisting of an asymmetrical pouch about 5 cm. long and 4 cm. broad ; leaves orbicular, deeply cordate, 8–12 cm. diam. (naturalized alien) .. .. 3. *ringens*

1. **A. bracteolata** *Lam.* Encyl. 1 : 258 (1783). *A. bracteata* Retz.—F.T.A. 6, 1 : 136 ; F.W.T.A., ed. 1, 1 : 77; Chev. Fl. Viv. 1 : 130. A small glabrous shrub, stems flexuous from a woody base ; flowers yellow-brown with a purple lip.
Fr.Sud.: L. Tacadji (Aug.) *Chev.* 3460 ! **Fr.Nig.:** *fide* Chev. *l.c.* **N.Nig.:** Bornu (Feb.) *E. Vogel* 45 ! Also in tropical E. Africa, S. Arabia and India. (See Appendix, p. 16.)

2. **A. albida** *Duchartre*—F.T.A. 6, 1 : 137 ; Chev. Fl. Viv. 1 : 131. *A. ledermannii* Engl. (1911). Stems glabrous, twining on other plants ; flowers blackish-purple.
Sen.: Bondou *Heudelot* 173. **Fr.Sud.:** *fide* Chev. *l.c.* **N.Nig.:** Nupe *Barter* 1531 ! Katagum *Dalz.* 87 ! **S.Nig.:** Lagos *Dawodu* 206 ! Also in Shari-Chad and Angola. (See Appendix, p. 16.)

3. **A. ringens** *Vahl* Symb. Bot. 3 : 99 (1794). A glabrous climber, with pale glaucescent leaves ; perianth pale green with dense dark violet network all over, especially dense on lobes ; fruit-baskets about 7 cm. long. Native of tropical America ; naturalized in several parts of Nigeria ; cultivated in Gold Coast.
S.Nig.: Ibadan Fuel Plantation (Feb.) *Brenan & Keay* 8981 ! Onitsha (Oct.) *Dundas* !

Besides the above, other species have been introduced into gardens, and may have become naturalized. I have seen five such species : *A. ridicula* N.E.Br. grown in the Aburi Botanic Gardens, Gold Coast ; *A. elegans* Mast. from Njala in Sierra Leone, Aburi, Kumasi and Abetifi Kwahu in Gold Coast, and Ibadan and Brass in Nigeria ; *A. gibbosa* Duchartre from Njala, Aburi and Kumasi ; *A. brasiliensis* Mast. & Zucc. from Njala ; *A. ringens* Vahl is naturalized in several parts of Nigeria and is included in the above key. All five species are natives of tropical America.

14. PIPERACEAE

Herbs or shrubs, erect or scandent ; vascular bundles more or less scattered, as in *Monocotyledones.* Leaves usually alternate, entire, rarely opposite or whorled, petiolate, stipules adnate to the petiole or absent. Flowers minute, hermaphrodite or unisexual, usually densely spicate or spikes umbellate. Perianth absent. Stamens 2–6, hypogynous ; filaments usually free ; anthers 2-celled, distinct or confluent. Ovary superior, 1-celled, 1-ovuled ; stigmas 1–5, short ; ovule erect. Fruit baccate, small, with a succulent, thin or dry pericarp. Seeds small, with small endosperm and copious mealy perisperm ; embryo very small.

Throughout the warmer regions of the world, comparatively rare in Africa, very abundant in tropical America. Readily recognized by the structure of the stem, the minute spicate flowers entirely devoid of perianth, the definite number of stamens, the 1-celled and 1-ovuled ovary, the baccate fruit, and minute embryo of the seed.

Herbs ; stamens 2, with confluent anther-cells ; stigma single, sessile, penicillate or undivided ; stipules absent ; leaves sometimes opposite or whorled 1. **Peperomia**
Shrubs ; stamens 2–6, usually with distinct anther-cells ; stigmas 2–5 ; stipules adnate to the petiole ; leaves alternate .. .. 2. **Piper**

1. PEPEROMIA Ruiz & Pav.—F.T.A. 6, 1 : 147.[1]

*Leaves alternate :
 †Lateral inflorescences leaf-opposed, or inflorescence terminal :
  Leaves cordate or rounded-cordate at base, with 5–7 nerves, very thin ; inflorescences very slender, with scattered flowers .. .. 1. *pellucida*
  Leaves rounded or cuneate at base, 3–5-nerved, moderately firm or rather thick :
   Leaves rounded and 5-nerved at base ; plant not very fleshy ; spikes slender 2. *molleri*
   Leaves cuneate and 3-nerved at base ; plant fleshy, stems becoming almost angular when dry ; spikes rather stout .. .. 3. *vulcanica*

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[1] I am indebted to J. P. M. Brenan of Kew for advice and assistance in the revision of the W. African species of *Peperomia.*—R.W.J.K.

†Lateral inflorescences axillary :

Leaves over 1 cm. long, not, or not entirely, orbicular, midrib distinct :

Leaves acutely acuminate, more or less ovate or lanceolate, 3·6 cm. long, 1·5–3 cm. broad ; inflorescences often paired ; stems creeping and rooting at the base, then ascending .. .. 4. *fernandopoiana*

Leaves obtuse, rounded or notched at apex ; inflorescences solitary :

Leaves entire at apex :

Petioles less than ⅓ length of lamina ; stems ascending from decumbent base :

Leaves broadly to narrowly rhomboid, obtuse at apex, 3–5 cm. long, 0·8–2 cm. broad .. .. 5. ? *stuhlmannii*

Leaves ovate to orbicular, up to about 15 mm. long and 8 mm. broad; ascending branches several together in a bunch .. .. 6. *retusa*

Petioles more than ⅓ length of lamina ; stems trailing and rooting nearly to the tip ; leaves elliptic-rhomboid to orbicular, up to about 1·8 cm. long and 1·4 cm. broad .. .. 7. *mannii*

Leaves notched at apex :

Spike 3–6 cm. long, 1 mm. broad ; leaves obovate to broadly oblanceolate, 2–3·5 cm. long, 1–1·5 cm. broad, long-petiolate ; stems ascending from decumbent base, ascending portions to about 15 cm. long .. 8. *vaccinifolia*

Spike 5–10 cm. long, 2–3 mm. broad ; leaves rhomboid-obovate, 2–5·3 cm. long, 1·5–4 cm. broad, petiole above 8 mm. long ; stems rather stout, decumbent below, ascending to about 30 cm. above .. .. .. 9. *hygrophila*

Leaves less than 1 cm. diam., thick and fleshy, orbicular, veins all hidden ; stems creeping and rooting nearly to the tip .. .. 10. *rotundifolia*

*Leaves opposite or whorled, spikes axillary or terminal :

Stems and leaves densely pubescent :

Undersurface of leaves showing only midrib, laterals very faint ; lamina elliptic-obovate, 1–2·5 cm. long and 1–1·8 cm. broad ; young shoots with brownish spreading pubescence .. .. 11. *kamerunana*

Undersurface of leaves with distinct main laterals ; lamina obovate-cuneate, 6–11 mm. long and 4–8 mm. broad ; young shoots with greyish-spreading pubescence .. .. 12. *dusenii*

Stems and leaves glabrous ; branching dichotomous ; leaves in fours, broadly obovate-elliptic, about 1·5 cm. long, shortly petiolate .. .. 13. *reflexa*

1. **P. pellucida** (*Linn.*) *H.B. & K.*—F.T.A. 6, 1 : 149 ; Chev. Fl. Viv. 1 : 142. *Piper pellucidum* Linn. (1753). A herb, usually erect and often terrestrial, with delicate leaves ; a common weed in moist situations.
Sen.: *Perrottet* ! Dakar *Chev.* 34002. **Fr.G.**: Farana (Feb.) *Chev.* 20634. **S.L.**: Lester Peak (Dec.) *Sc. Elliot* 3885 ! Kumrabai-Mamila (Nov.) *Deighton* 4943 ! **Lib.**: Monrovia (Nov.) *Linder* 1529 ! **Iv.C.**: Upper Sassandra (May) *Chev.* 21559. **G.C.**: Bunsu (Mar.) *Irvine* 1809 ! **N.Nig.**: Patti Lokoja (Sept., Nov.) *T. Vogel* 192 ! *Dalz.* 211 ! **S.Nig.**: Lagos (Jan.) *Dalz.* 1275 ! **Br.Cam.**: Victoria (Nov.) *Thorold* 77 ! **F.Po**: (Dec.) *Guinea* 609 ! Cosmopolitan in tropics. (See Appendix, p. 16.)

2. **P. molleri** *C. DC.* in Henriq. Bol. Soc. Brot. 10 : 154 (1893) ; Exell Cat. S. Tomé 277 ; F.T.A. 6, 1 : 150. *P. fernandopoiana* var. *subopacifolia* C. DC. (1869). *P. zenkeri* C. DC. (1894)—F W.T.A., ed. 1, 1 : 79 ; Chev. Fl. Viv. 1 : 143. *P. holstii* C. DC. (1894)—F.T.A. 6, 1 : 151. *P. baumannii* C. DC. (1899)—F.T.A. 6, 1 : 149. A delicate herb, more or less erect ; epiphytic.
G.C.: Obosomase (Aug.) *Johnson* 176 ! **Togo**: Misahöhe (July) *Baumann* 205. **S.Nig.**: Akure F.R. (Nov.) *Keay* FHI 25563 ! **Br.Cam.**: Buea, 3,000 ft. (Oct.) *Preuss* 1060 ! **F.Po**: (Jan.) *Guinea* 1844 ! Widespread in tropical Africa.

3. **P. vulcanica** *Baker & C. H. Wright* in F.T.A. 6, 1 : 151 (1913). Stout fleshy herb with erect stems, in mist forest and on lava.
Br.Cam.: Cam. Mt., 8,000 ft. (Jan.) *Mann* 1305 ! Mann's Spring 7,000 ft. (Mar.) *Brenan* 9373 !

4. **P. fernandopoiana** *C. DC.* in Seem. Journ. Bot. 1866 : 134 (*excl.* var. *subopacifolia* C. DC.) ; F.T.A. 6, 1 : 154. *P. preussii* C. DC. (1894)—F.T.A. 6, 1 : 150 ; F.W.T.A., ed. 1, 1 : 78. *P. staudtii* Engl. (1899) —F.W.T.A., ed. 1, 1 : 79 ; Chev. Fl. Viv. 1 : 143. Perennial herb, stems trailing and rooting, stems and undersides of leaves purplish ; usually epiphytic.
Fr.G. & Iv.C.: *fide* Chev. *l.c.* **S.Nig.**: Oban *Talbot* 2324 ! Koloishe, Obudu, 4,000 ft. (Dec.) *Keay & Savory* FHI 25040 ! **Br.Cam.**: Buea, 4,000 ft. (Feb.) *Deistel* 587 ! *Maitland* 419 ! Cam. Mt., 3,500–5,700 ft. (Feb.–Apr.) *Dalz.* 8340 ! *Hutch. & Metcalfe* 35 ! *Brenan* 9342 ! L. Bambulue, Bamenda, 7,200 ft. (Jan.) *Migeod* 373 ! **F.Po**: *Mann* 394 ! Moka (Jan.) *Guinea* 2101 ! Also in French Cameroons.

5. **P. ? stuhlmannii** *C.DC.*—F.T.A. 6, 1 : 152. *P. vaccinifolia* of F.T.A. 6, 1 : 152, partly (Sierra Leone spec.), not of C. DC. Epiphytic herb.
S.L.: Sugar Loaf Mt. (Apr., May) *Sc. Elliot* 5755 ! *Barter* ! Kamadugu to Bandakarafaia, 1,500 ft. (Nov.) *Glanville* ! Sankon Biriwa, 4,000 ft. (Feb.) *Deighton* 3509 ! Simbaru (Jan.) *Deighton* 4583 ! Yifin (Apr.) *Deighton* 5100 ! **Lib.**: R. Mao, Nyandamolahun (Feb.) *Bequaert* 76 ! **G.C.**: *Irvine* 1178 ! **Br.Cam.**: Tombel (Nov.) *Thorold* 76 !
[Very close to Uganda specimens of *P. stuhlmannii* C. DC., but type (*Stuhlmann* 2485 from Ruwenzori) not seen.]

6. **P. retusa** (*Linn. f.*) *A. Dietr.*—Fl. Capensis 5, 1 : 491. *Piper retusum* Linn. f. (1781). *P. ulugurensis* Engl.—F.T.A. 6, 1 : 151. Small epiphyte with erect branches.
S.Nig.: Oban *Talbot* 657 ! **Br.Cam.**: L. Oku, Bamenda (Jan.) *Keay* FHI 28532 ! Also on highlands of tropical E. Africa, and in S. Africa.

7. **P. mannii** *Hook. f. ex C. DC.*—F.T.A. 6, 1 : 153 (incl. var. *fernandopoana* C. DC.). *P. bueana* C. DC.—F.W.T.A., ed. 1, 1 : 80. Epiphyte with slender trailing stems.
S.Nig.: Shasha F.R. (May) *Richards* 3317 ! 3477 ! Okomu F.R. (Dec., Feb.) *Brenan* 8484 ! 9009 ! **Br.Cam.**: Cam. Mt., 4,000–7,000 ft. (Dec.–Apr.) *Mann* 2016 ! *Preuss* 663 ! *Dunlap* 3 ! 48 ! *Hutch. & Metcalfe* 4 ! *Brenan* 9372 ! **F.Po**: *Mann* 291 ! Balacha to Ureka (Feb.) *Guinea* 2304 ! 2306 !

8. **P. vaccinifolia** *C. DC.*—F.T.A. 6, 1 : 152 (excl. Sierra Leone spec.). Herb with trailing stems, on ground and epiphytic.
Br.Cam.: Cam. Mt., 5,000–6,000 ft. (Nov.) *Preuss* 875*a* ! *Migeod* 141 ! Cam. Mt., Mimbia, 4,400 ft. (Nov.) *Brenan* 9364 ! **F.Po**: Moka (Jan.) *Guinea* 2223 !

9. **P. hygrophila** *Engl.* in Mildbr. Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–08, 2 : 177 (1911). Stems prostrate below, ascending above, leaves succulent, spike stout ; in caves.
Br.Cam.: Cam. Mt., 8,000–8,300 ft. (June) *Mildbr.* 3400. Between Buea and Mann's Spring (May) *Preuss* 805 ! Also in S. Tomé.

10. **P. rotundifolia** (*Linn.*) *H.B. & K.* Nov. Gen. & Sp. 1 : 65 (1815). *Piper rotundifolium* Linn. (1753). *P. bagroana* C.DC.—F.T.A. 6, 1 : 154 ; F.W.T.A., ed. 1, 1 : 80 ; Chev. Fl. Viv. 1 : 142. Annual with filiform creeping stem and orbicular leaves.
S.L.: Bagroo R. (Apr.) *Mann* 905 ! Melekuri (Mar.) *Glanville* 430 ! Mendekiama, Gaura (Nov.) *Deighton* 5031 ! **Lib.:** Shew (Nov.) *Linder* 1392 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kibbi (Dec.) *Johnson* 273 ! Effiduase *Cox* 118 ! Begoro, Akim (Jan.) *Irvine* 1162 ! **Togo:** *Büttner* ! **Br.Cam.:** Tombel (Nov.) *Thorold* 75 ! Widespread in tropical Africa and in Madagascar and tropical America.

11. **P. kamerunana** *C. DC.*—F.T.A. 6, 1 : 154. Epiphyte with fleshy, creeping stems, hairy.
Br.Cam.: *Preuss* 918 ! Cam. Mt., 6,700 ft. (Mar., Apr., Nov.) *Brenan* 9371 ! *Migeod* 84 ! *Maitland* 1174 ! **F.Po:** Finca de Puente (Jan.) *Guinea* 1674 ! 1820 !

12. **P. dusenii** *C. DC.*—F.T.A. 6, 1 : 155. Apparently creeping at the base, with dwarf erect shoots to 4 in. high.
Br.Cam.: *Dusen* 436 !

13. **P. reflexa** (*Linn. f.*) *A. Dietr.*—F.T.A. 6, 1 : 155 ; Chev. Fl. Viv. 1 : 143. *Piper reflexum* Linn. f. (1781). Stems tufted, creeping ; leaves shining.
Fr.G.: Dalaba, 3,500 ft. (Dec.) *Chev.* 20288. Diaguissa, 3,000–4,000 ft. (Apr.) *Chev.* 13456. **S.L.:** Bintumane Peak, 5,400 ft. (Jan.) *T. S. Jones* 65 ! **Br.Cam.:** Cam. Mt., 4,000–7,000 ft. (Jan.) *Dunlap* 5 ! 223 ! L. Bambulue, Bamenda, 6,700 ft. (Jan.) *Keay* FHI 28360 ! Widespread throughout the tropics.

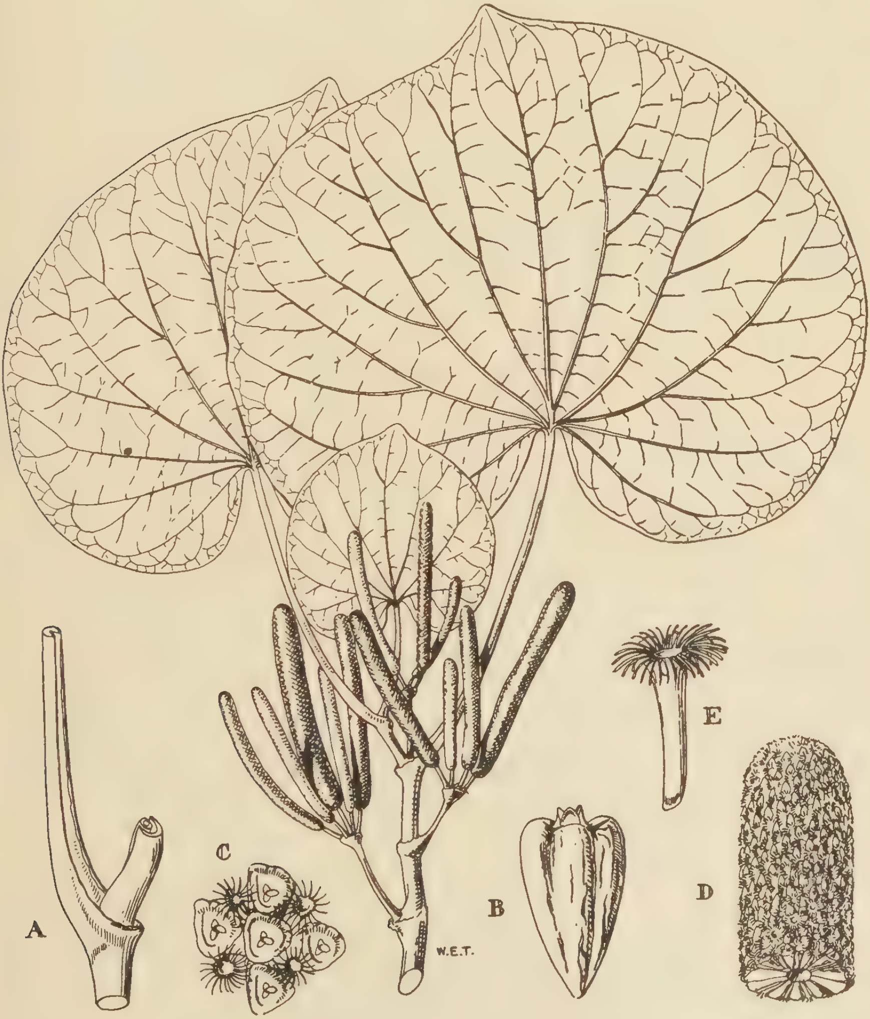

Fig. 25.—Piper umbellatum *Linn.* (Piperaceae).

A, base of petiole. B, ovary. C, portion of spike showing flowers and bracts. D, portion of spike. E, bract.

2. **PIPER** Linn.—F.T.A. 6, 1 : 144.

Inflorescence solitary, leaf-opposed or terminal ; leaves rounded or slightly cordate at base :
  Fruits spicate ; peduncle as long as or longer than the flowering axis ; stigmas 2 ; leaf-base 7-nerved .. .. 1. *capense*
  Fruits racemose ; pedicels up to 5 mm. long ; peduncle usually shorter than the flowering axis ; stigmas 3 ; leaf-base at most 5-nerved .. .. 2. *guineense*
Inflorescences from 2 to several in a pedunculate axillary umbel ; peduncle shorter than the flowering axis ; stigmas 3 ; leaves deeply cordate and many-nerved at base 3. *umbellatum*

1. **P. capense** *Linn. f.*—F.T.A. 6, 1 : 146 (incl. var. *magnifolium* C. DC.) ; Chev. Fl. Viv. 1 : 138. *P. bisexuale* C. DC. (1914). A shrub, erect or more or less scandent.
Fr.G.: Dalaba-Diaguissa Plateau, 3,000–4,000 ft. *Chev.* 18748. **S.Nig.:** Ijua, Obudu, 3,000 ft. (Dec.) *Keay & Savory* FHI 25027 ! **Br.Cam.:** Cam. Mt., 4,000–8,000 ft. (Nov.–Apr.) *Mann* 2015 ! *Preuss* 615 ! *Maitland* 1283 ! *Brenan* 9353 ! Above Bamenda, 6,500–7,000 ft. (Feb.) *Migeod* 471 ! 485 ! **F.Po:** 1,300 ft. *Mann* 299 ! Also in French Cameroons and in East and South Africa.
[The specimens in our area have mostly glabrescent leaves, and the peduncles are often longer than the flowering axis ; the reverse is the case in the S. African material.]

2. **P. guineense** *Schum. & Thonn.*—F.T.A. 6, 1 : 145 ; Chev. Fl. Viv. 1 : 139. *P. leonense* C. DC. (1866)—Chev. Fl. Viv. 1 : 140. *P. famechonii* C. DC. (1914). A climber, 30–40 ft. long, on trees ; fruit red or red-brown when ripe, black when dry.
Port G.: *Viegas* 189 ! **Fr.G.:** Kafogo (fr. Apr.) *Sc. Elliot* 4003 ! Kissidougou (Feb.) *Chev.* 20719. **S.L.:** *Don* ! Dunnia Talla (fr. Feb.) *Sc. Elliot* 4875 ! Yonibana (Nov.) *Thomas* 4788 ! **Lib.:** Gbanga (Sept.) *Linder* 569 ! 672 ! Dukwia R. (fr. Feb.) *Cooper* 305 ! **Iv.C.:** common *fide* Chev. *l.c.* **G.C.:** E. Akim (fl. Mar., fr. June) *Johnson* 720 ! 745 ! Bissa (fr. Nov.) *Sampson* 1 ! **N.Nig.:** Nupe *Barter* ! **S.Nig.:** Lagos (fr. Mar.) *Millen* 65 ! Okomu F.R. (fr. Jan.) *Brenan* 8782 ! Brass *Barter* 2076 ! **F.Po:** (Jan.) *Mann* 162 ! (fr. June) *Barter* ! (fr. Nov.) *T. Vogel* 97 ! Also in French Cameroons and extends to Angola and Uganda. (See Appendix, p. 16.)

3. **P. umbellatum** *Linn.*—F.T.A. 6, 1 : 144 ; Chev. Fl. Viv. 1 : 137. A shrub, 4–6 ft. high, with white narrow catkins ; in moist shady places.
Fr.G.: Kouria (Nov.) *Caille* in *Hb. Chev.* 14856. Dalaba-Diaguissa Plateau, 3,000–4,000 ft. (Oct.) *Chev.* 18778. **S.L.:** near Regent (Dec.) *Sc. Elliot* 4077 ! Njala *Deighton* 2551 ! **Lib.:** Sinoe Basin *Whyte* ! Gbanga (Sept.) *Linder* 531 ! **Iv.C.:** various localities *fide* Chev. *l.c.* **G.C.:** Kumasi *Cummins* 149 ! W. Apollonia (Aug.) *Chipp* 321 ! **N.Nig.:** Lokoja (Feb.) *Dalz.* 923 ! **S.Nig.:** Lagos (Mar.) *Millen* 113 ! Oban *Talbot* 172 ! **Br.Cam.:** Cam. Mt., 3,000–4,000 ft. (Jan.–Feb.) *Mann* 1272 ! *Dunlap* 12 ! **F.Po:** *Mann* 70 ! *T. Vogel* 53 ! (See Appendix, p. 17.)

The following species are cultivated in gardens : *P. betle* Linn., *P. cubeba* Linn. f., *P. nigrum* Linn. (Holl. 4 : 552).

15. PAPAVERACEAE

Annual, biennial, or perennial herbs with coloured juice, often glaucescent and prickly, or rarely shrubs or small trees ; root usually a rhizome or tuber. Leaves exstipulate, alternate, rarely the floral leaves opposite or whorled, much divided, rarely entire. Flowers hermaphrodite, actinomorphic, hypogynous or rarely perigynous, mostly solitary, fugacious and visited by pollen-eating insects. Perianth of calyx and corolla, or rarely the latter absent. Sepals 2, rarely 3, green, falling off separately on the opening of the flower or united into a deciduous calyptra. Petals showy, 4 or 6, rarely 8 or 12, free, imbricate and often crumpled in the bud, deciduous. Stamens numerous, rarely few, free, with filiform filaments; anthers mostly nearly as long as the filaments, 2-celled, dehiscing by longitudinal slits. Ovary free, of 2 or more united carpels, 1-celled with parietal placentas, or several-celled by the placentas reaching to the middle. Ovules numerous, rarely solitary. Fruit a capsule, opening by valves or pores. Seeds small, with minute embryo in fleshy or oily endosperm.

Mainly natives of the North Temperate Zone, rare in the tropics ; represented in our area by a single introduced species.

ARGEMONE Linn.—F.T.A. 1 : 54.

Sepals 2–3. Petals 4–6, yellow. Stamens numerous. Ovary with 4–7 placentas ; stigmas radiating. Capsule opening by valves at the top. Seeds pitted.

A. mexicana *Linn.*—F.T.A. 1 : 54 ; Chev. Fl. Viv. 1 : 145. A prickly glaucous erect herb, with yellow juice ; leaves semi-amplexicaul, pinnately lobed ; flowers bright yellow ; capsule smooth or setose, 3–4 cm. long ; seeds pitted-reticulate. Mexican Poppy, introduced from America and found in waste dry places and roadsides throughout the area and in other parts of Africa.
Sen.: *Roger* 70 ! Dakar (Dec.) *Debeaux* ! **Fr.G.:** Kouroussa (Oct.) *Pobéguin* 562 ! Farana (Mar.) *Sc. Elliot* 5323 ! **S.L.:** *Deighton* 2009 ! **Lib.:** (May) *Willmott* ! **G.C.:** Tamale (Apr.) *Williams* 153 ! N'Kwanta, W. Ashanti (Jan.) *Chipp* 63 ! Afram Plains (Apr.) *Cansdale* 4384 ! **Dah.:** *Burton* ! **N.Nig.:** Sokoto (Jan.) *Lugard* ! Bauchi Plateau (Mar.) *Lely* P. 193 ! **S.Nig.:** Oshogobo (Apr.) *Moloney* ! Lanlate (July) *Foster* 113 ! **Br.Cam.:** *Talbot* 1411 ! (See Appendix, p. 17.)

16. TURNERACEAE

Herbs or undershrubs with entire or lobed alternate leaves ; stipules absent. Flowers hermaphrodite, actinomorphic, yellowish. Calyx tubular, 5-toothed, teeth imbricate. Petals 5, inserted on the calyx-tube, free, clawed, contorted. Stamens 5, from the base of the calyx-tube ; filaments free ; anthers 2-celled, opening lengthwise. Ovary superior, 1-celled with 3 parietal placentas ; styles 3, terminal, slender ; stigmas fringed ; ovules numerous. Fruit a capsule, opening loculicidally by 3 valves with the placenta in the middle of each. Seeds arillate, pitted ; endosperm horny or fleshy ; embryo straight, large.

Tropics and subtropics. Mostly herbaceous and resembling *Cruciferae* or *Capparidaceae*. Recognized by the tubular calyx and 1-celled ovary with parietal placentas.

Turnera ulmifolia Linn. (var. *elegans* Urb., and var. *angustifolia* Urb.), a native of tropical America, is cultivated in Sierra Leone (Njala) and Gold Coast (Aburi).

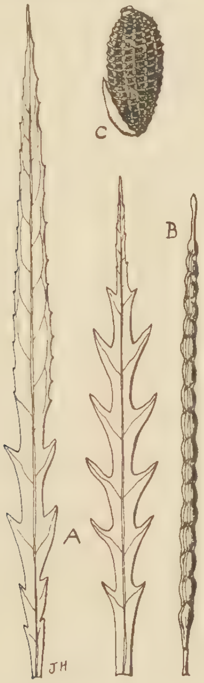

FIG. 26.—WORMSKIOLDIA PILOSA (*Willd.*) *Schweinf. ex Urb.* (TURNERACEAE).

A, leaves.
B, fruit.
C, seed.

WORMSKIOLDIA Thonn.—F.T.A. 2 : 501.

Herbs. Calyx tubular, 5-toothed. Petals 5, clawed, with a scale at their base. Stamens 5, arising from the base of the calyx-tube. Ovary 1-celled ; styles 3, slender ; stigmas fringed. Capsule linear, opening loculicidally by 3 valves with the placenta in the middle of each ; seeds conspicuously pitted.

A branched herb about 1 ft. high ; stems finely pubescent and with numerous purple bristles ; leaves linear or linear-lanceolate, entire, denticulate or pinnatilobed, up to 18 cm. long and 1 cm. broad, glabrous or shortly bristly beneath ; flowers much resembling a Crucifer, racemose ; calyx long-tubular, narrow, 1 cm. long, shortly 5-lobed, more or less bristly outside ; petals exceeding the calyx ; pod slender, slightly torulose, about 5 cm. long, shortly stipitate, beaked ; seeds about 20, about 3 mm. long, straw-coloured, conspicuously pitted .. .. .. *pilosa*

W. pilosa (*Willd.*) *Schweinf. ex Urb.* in Jahrb. Kgl. Bot. Gart. Berl. 2 : 54 (1883) ; Chev. Fl. Viv. 1 : 148. *Rapanus pilosus* Willd. (1801). *W. heterophylla* Schum. & Thonn. (1827) ; Guill. & Perr. Fl. Seneg. t. 11 ; F.T.A. 2 : 503. Annual herb, flowers bright yellow.
Sen.: St. Louis *Leprieur* ; *Perrottet*. **Gam.:** Kuntaur (July, Aug.) *Ruxton* 68 ! 138 ! **Fr.Sud.:** Gourma (July) *Chev.* 24494. **Port.G.:** Catió, Granja (July) *Esp. Santo* 2129 ! **G.C.:** *Hb. Vahl* ! Gambaga (June) *Akpabla* 674 ! **Dah.:** Savalou (May) *Chev.* 23736. **N.Nig.:** Patti Lokoja (Sept.) *T. Vogel* 188 ! Nupe *Barter* 1552 ! Liruwen-Kano Hills *Carpenter* ! Birnin Gwari, Mando (June) *Keay* FHI 25849 ! Zungeru (Oct.) *Dalz.* 93 ! Bauchi Plateau (July) *Lely* P. 509 ! Also in Ubangi-Shari, French Cameroons, A.-E. Sudan, Uganda, Kenya and Tanganyika.

17. CAPPARIDACEAE

Herbs, shrubs or trees, sometimes scandent. Leaves alternate or rarely opposite, simple or digitately 3–7-foliolate ; stipules when present minute or spiny. Flowers mostly hermaphrodite, actinomorphic or rarely zygomorphic, hypogynous, axillary or terminal, variously arranged. Perianth of calyx and corolla, or the latter absent. Sepals free or partially united, imbricate or valvate, usually 4. Petals 4 to many or absent. Torus elongated or short, rarely with an appendix. Stamens few to many, sometimes some of them without anthers ; filaments sometimes partially adnate to the torus ; anthers 2-celled, longitudinally dehiscent. Ovary sessile or more usually supported on a long or short gynophore, 1-celled with parietal placentas or divided into 2 or more cells by spurious dissepiments ; ovules few to many. Fruit a capsule or berry, sometimes the latter elongate or torulose. Seeds usually reniform or angular ; endosperm none or scanty ; embryo arcuate or incurved.

Tropics and subtropics of both hemispheres, very numerous in East Africa and South America. Recognized by the usually showy flowers, clawed petals, mostly stipitate ovary, parietal placentas and curved embryo with scanty or no endosperm.

Fruit a capsule, splitting its full length into two valves ; mostly herbaceous annuals :
Torus short, not adnate to the free filaments ; stamens 4 to many .. 1. **Cleome**
Torus elongated into a gynophore bearing the filaments ; stamens usually 6 2. **Gynandropsis**
Fruit a berry or drupe, often torulose ; shrubs or trees or rarely suffrutescent with woody rhizomes and annual shoots :
Petals present :
Sepals connate into a tube at the base, valvate in a single series ; fruits generally torulose ; leaves simple .. .. 3. **Maerua**
Sepals free to the base or nearly to the base ; imbricate or if in 2 series only the outer ones coherent and valvate ; or valvate in a single series :
Sepals in 2 series ; leaves simple :
Stamens numerous ; fruits not torulose .. .. 4. **Capparis**
Stamens 4–8 ; fruits often subtorulose .. .. 5. **Cadaba**
Sepals imbricate in a single series ; leaves trifoliolate ; stamens 8–20 ; fruits not torulose .. .. 6. **Crateva**
Sepals valvate in a single series ; leaves trifoliolate or up to 5-foliolate, rarely 1-foliolate :
Petals equal ; torus without an appendage at the base ; stamens 12 to many 7. **Ritchiea**
Petals unequal, 2 much larger than the other 2 ; torus with a linear appendage of united staminodes between the two larger petals ; stamens 5–7 8. **Euadenia**
Petals absent ; leaves simple :
Calyx imbricate :
Small shrubs, with small leaves ; flowers more or less shortly corymbose ; stamens 4–5 ; fruit torulose or small and elliptic.. .. .. 5. **Cadaba**
Trees ; leaves large ; flowers in rather long lax racemes ; stamens indefinite ; fruits large, ellipsoid .. .. 9. **Buchholzia**
Calyx valvate in a single series :
Fruit torulose ; seeds numerous ; calyx tubular at the base .. .. 3. **Maerua**
Fruit entire, globose or ellipsoid ; seeds few :
Flowers racemose or subpaniculate ; ovary 1-celled ; fruit globose .. 10. **Boscia**
Flowers axillary, solitary ; ovary 2–3-celled ; fruit ellipsoid .. 11. **Courbonia**

1. CLEOME Linn.—F.T.A. 1 : 74.

Leaves simple :
Leaves ovate to orbicular, 1–2 cm. long, setose-pilose, the marginal hairs gland-tipped ; fruits falcate, slightly recurved, about 2·5 cm. long, slightly muricate 1. *scaposa*
Leaves lanceolate or linear-lanceolate, up to 6 cm. long, setulose on the nerves beneath ; fruits nearly straight, ascending, about 6 cm. long, strigose-pubescent 2. *monophylla*
Leaves digitately compound :
*Leaflets filiform or linear :
Branches and leaflets filiform ; fruits not stipitate, 3·5–4 cm. long, 2 mm. broad ; flowers small, about 4 mm. long .. .. 3. *tenella*
Branches not filiform ; leaflets linear :
Fruits 3–6 cm. long, stipitate, 2 mm. broad ; flowers 8–10 mm. long 4. *polyanthera*
Fruits about 12 cm. long, stipitate ; flowers large, 3 cm. long .. 5. *paradoxa*

*Leaflets lanceolate to obovate :

Stems with prickles at the base of the leaves and sometimes prickles also on the petioles :

Flowers in a dense corymbose raceme ; lower leaves long-petiolate ; leaflets often 5–7, oblanceolate, acutely acuminate, up to 10 cm. long ; the upper leaves gradually reduced to leafy subsessile bracts ; fruits long-stipitate, 4–6·5 cm. long, 6–9 mm. diam. .. .. 6. *spinosa*

Flowers in few-flowered racemes ; lower leaves long-petiolate ; leaflets 3, rhomboid to obovate, up to 3 cm. long ; the upper leaves gradually reduced to subsessile ovate bracts ; fruits shortly stipitate, about 4 cm. long and 2–3 mm. diam. 7. *aculeata*

Stems not prickly :

Fruits not stipitate ; plants glandular-pubescent :

Leaflets 3–6, often 5, about 3 cm. long ; pedicels up to 6·5 cm. long ; fruits about 9 cm. long .. .. 8. *viscosa*

Leaflets 3, mostly small, up to 1·5 cm. long ; pedicels slender, up to 1 cm. in fruit, the latter 1–1·25 cm. long, capped by the long slender style 9. *brachycarpa*

Fruits stipitate ; plants not glandular ; leaflets mostly 3 :

Perennial with woody stock ; leaflets oblong, rounded at apex, 6–15 mm. long, 3–4 mm. broad, petiole 5–10 mm. long ; scape with very small 1–3-foliate leaves ; petals 6–8 mm. long ; fruit 3–4 cm. long .. .. 10. *montana*

Annual herb ; leaflets ovate-lanceolate, acute at apex, 1–4·5 cm. long, 8–18 mm. broad, petiole 1–5·5 cm. long ; petals 8–10 mm. long ; fruit 2·5–6 cm. long 11. *ciliata*

1. **C. scaposa** *DC.*—Gilg & Benedict in Engl. Bot. Jahrb. 53 : 153 ; Chev. Fl. Viv. 1 : 152. Erect slender-branched herb, roughly setose, flowers yellow.
Fr.Sud.: Amongo (Sept.) *Hagerup* 379 ! Also various localities *fide* Chev. *l.c.* **N.Nig.:** Sokoto (Dec.) *Moiser* 188 ! Also in Mauritania, Tibesti, Eastern Sudan, Abyssinia, Somaliland and Arabia.

2. **C. monophylla** *Linn.*—F.T.A. 1 : 76 ; Chev. Fl. Viv. 1 : 153. Erect herb branching, up to 2 ft. ; flowers white to pink.
Sen.: Galam *Heudelot* 425 ! **Fr.Sud.:** Kangara (May) *Chev.* 853. Diaguara (June) *Chev.* 1018. **G.C.:** *Williams* 544 ! **Fr.Nig.:** Kokoro *Rogeon* 507. **N.Nig.:** Nupe *Barter* 796 ! Katagum *Dalz.* 135 ! Sokoto (July) *Dalz.* 382 ! Bauchi Plateau (Jan., June) *Lely* 273 ! P. 94 ! *Dent Young* 5 ! Also throughout tropical Africa and sub-tropical S. Africa. (See Appendix, p. 20.)

3. **C. tenella** *Linn. f.*—F.T.A. 1 : 78 ; Chev. Fl. Viv. 1 : 153. Erect shrub, 1–2 ft. high, glabrous, glaucescent, with abundantly forked branching ; flowers white.
Sen.: Walo *Heudelot* 429 ! *Hussenot* ! **Fr.Sud.:** Île de Bourem (July) *Chev.* 1289. Extends to Eastern Sudan, Zanzibar, Madagascar, Socotra and India.

4. **C. polyanthera** *Schweinf. & Gilg*—Gilg & Benedict l.c. 165 ; Chev. Fl. Viv. 1 : 154. Erect herb, 1–2 ft. high, somewhat glandular ; flowers white or purplish.
N.Nig.: Yola (July) *Dalz.* 179 ! Extends into Eastern Sudan.

5. **C. paradoxa** *R. Br. ex DC.*—F.T.A. 1 : 78 ; Chev. Fl. Viv. 1 : 155. Shrubby, 2–3 ft. high ; leaves 3–6-foliolate ; flowers conspicuous, in terminal racemes.
Fr.Sud.: Goundam (Aug.) *Chev.* 2490 ! Also in Mauritania, Nubia, Abyssinia and Arabia.

6. **C. spinosa** *Jacq.*—F.T.A. 1 : 78 ; Chev. Fl. Viv. 1 : 155. Much-branched erect herb, up to 3–5 ft. ; flowers white to pink.
N.Nig.: Abinsi (July) *Dalz.* 742 ! **S.Nig.:** Oshogbo (Apr.) *Millson* 5 ! Lagos (Aug.) *Phillips* 21 ! Omo F.R. (Feb.) *Jones* FHI 16825 ! FHI 17247 ! Calabar *Thomson* 118 ! *Williams* 1 ! **Br.Cam.:** Moliko, 2,000 ft. (Apr.) *Hutch. & Metcalfe* 87 ! Also in French Cameroons and Congo region ; a native of tropical S. America. (See Appendix, p. 21.)

7. **C. aculeata** *Linn.* Syst. ed. 12, 3 : 232 (1768). Much-branched herb, to 2 ft. high, flowers white.
Fr.G.: Farmoréah *Jac.-Fel.* 1720 ! **S.L.:** Port Loko (Dec.) *Thomas* 5826 ! Yungeru (Jan.) *Thomas* 7250 ! 7392 ! Freetown (Dec.) *Deighton* 475 ! Kambia (Dec.) *Deighton* 898 ! Mano (Nov., May) *Deighton* 1433 ! 1735 ! Bonthe (Nov.) *Deighton* 2266 ! **Lib.:** Monrovia (July, Nov.) *Linder* 16 ! 1563 ! A native of tropical S. America, naturalized in many localities in Sierra Leone and in Belgian Congo.

8. **C. viscosa** *Linn.*—F.T.A. 1 : 80 ; Chev. Fl. Viv. 1 : 156. *C. foliosa* of Chev. Bot. 25 ; of F.W.T.A., ed. 1, 1 : 84 ; of Chev. Fl. Viv. 1 : 159 ; not of Hook. f. Erect herb, to 2 ft. high, very sticky, flowers yellow.
Sen.: Kouma *Heudelot* 426 ! **Fr.Sud.:** Goundam (Aug.) *Chev.* 2491 ! Bamako *Waterlot* 1112 ! **Fr.G.:** Kindia *Jac.-Fel.* 38 ! **S.L.:** Freetown (Dec.) *Deighton* 473 ! **Fr.Nig.:** Tlemcés *Le Rumeur* 83. **Dah.:** Atacora Mts. (June) *Chev.* 23965 ! **N.Nig.:** Sokoto (July) *Dalz.* 380 ! Mokwa (Apr.) *Keay* FHI 25713 ! Yola (July) *Dalz.* 57 ! **S.Nig.:** Lagos (Mar.) *Dalz.* 1392 ! Ibadan (Apr.) *Jones* FHI 14103 ! Also in Cape Verde Islands, Mauritania, Cameroons to Eastern Sudan, S. Arabia and Socotra. (See Appendix, p. 21.)

9. **C. brachycarpa** *Vahl ex DC.*—F.T.A. 1 : 77 ; Chev. Fl. Viv. 1 : 157. A low diffuse herb, with numerous branches from a woody rhizome.
Fr.Sud.: Goundam (Aug.) *Chev.* 2493. Also in Mauritania, Eastern Sudan, Abyssinia, and on the coasts of the Red Sea to Arabia and India.

10. **C. montana** *A. Chev. ex Keay* in Kew Bull. 1953 : 287 ; Chev. Fl. Viv. 1 : 159 (1938), French descr. only. Perennial herb with woody stock, erect stems to 18 in. high.
Fr.G.: Mali, Fouta Djalon, 4,500 ft. *Chev.* 34461 !

11. **C. ciliata** *Schum. & Thonn.*—F.T.A. 1 : 78 ; Chev. Fl. Viv. 1 : 158. Annual weed of waste places and fields, 2–3 ft. high ; flowers white, lilac or pink.
Fr.G.: *Heudelot* 625 ! **S.L.:** Sherbro *Garrett* 5849 ! Freetown (Dec.) *Deighton* 498 ! *Hagerup* 767*a* ! Gbinti (Sept.) *Deighton* 4847 ! **Lib.:** Grand Bassa *T. Vogel* 34 ! Sinoe Basin *Whyte* ! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Aburi (June) *Brown* 319 ! Cape Coast *T. Vogel* ! Akim *Irvine* 562 ! **Togo:** Lome *Warnecke* 313 ! **N.Nig.:** R. Niger, Stirling (Sept.) *T. Vogel* 131 ! 152 ! Abinsi (July) *Dalz.* 741 ! **S.Nig.:** Lagos *Dawodu* 29 ! Idanre (Jan.) *Brenan & Jones* 8720 ! **Br.Cam.:** Mamfe (Dec.) *Migeod* 263 ! **F.Po:** (Nov.) *Mann* 560 ! Also in Principe, Cameroons and Congo to Angola. (See Appendix, p. 21.)

2. GYNANDROPSIS DC.—F.T.A. 1 : 81.

Leaves digitately 5-foliolate, long-petiolate ; leaflets obovate to oblanceolate, up to 5 cm. long, acute or obtuse, slightly pubescent or glabrous ; bracts foliaceous, the lower trifoliolate, the uppermost becoming simple, subsessile ; inflorescence racemose, the lower flowers often already in fruit before the uppermost have opened ; petals 1–1·5 cm. long ; fruits long-stipitate, the stipe composed of the gynophore and the slender base of the fruit, fruit-body about 6–7 cm. long, reticulate .. *gynandra*

G. gynandra (*Linn.*) *Briq.* in Ann. Conserv. Jard. Bot. Genèv. 17 : 382 (1914) ; Chev. Fl. Viv. 1 : 162. *Cleome gynandra* Linn. (1753). *Cleome pentaphylla* Linn. (1763). *G. pentaphylla* DC.—F.T.A. 1 : 82 ; F.W.T.A., ed. 1, 1 : 84. Herb, about 2 ft. high, flowers white to purplish ; weed of waste places and fields.
Sen.: *Perrottet* ! **Fr.Sud.:** Timbuktu (fl. July, fr. Sept.) *Hagerup* 154*a* ! *Chudeau* ! **Fr.G.:** Kouroussa (May) *Pobéguin* 259 ! **S.L.:** (June) *T. Vogel* 21 ! **G.C.:** Afram Plains (May) *Kitson* 1088 ! Ashanti *Irvine* 538 ! **Togo:** Lome *Warnecke* 291 ! **N.Nig.:** Kukawa (Feb.) *E. Vogel* 57 ! Sokoto (Nov.) *Moiser* 24 ! **S.Nig.:** Lagos (Aug.) *Phillips* 24 ! Olokemeji (Apr.) *Foster* 286 ! **Br.Cam.:** Victoria (Apr.) *Ejiofor* FHI 29333 ! All over north and tropical Africa and India, occurring also in America. (See Appendix, p. 21.)

Beside the above, *G. speciosa* DC., a native of central and S. America, has been introduced into gardens (e.g. Sierra Leone, Njala *Deighton* 1904 ! Nigeria, Sapoba *Kennedy* 427 !). The flowers and leaves are larger than in *G. gynandra* and the plant is almost glabrous.

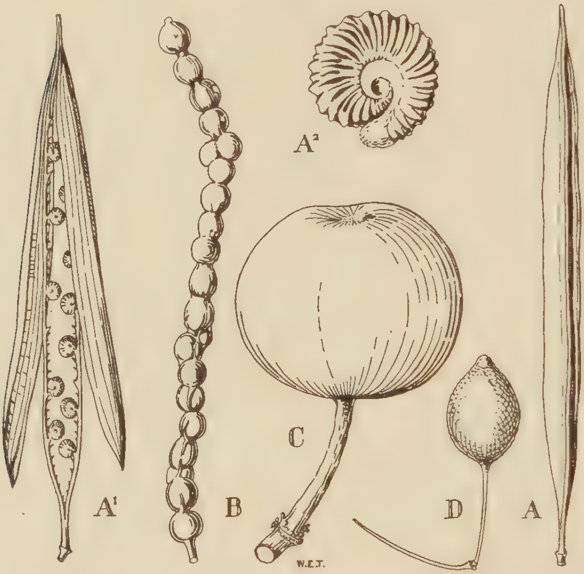

FIG. 27.—FRUITS OF CAPPARIDACEAE.

A, fruit of *Cleome ciliata* Schum. & Thonn.
A1, fruit open.
A2, seed.
B, fruit of *Maerua angolensis* DC.
C, fruit of *Crateva religiosa* Forst. f.
D, fruit of *Ritchiea duchesnei* (De Wild.) Keay.

3. MAERUA Forsk.—F.T.A. 1 : 83 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 232 (1915).

Leaves small or rather small, with the flowers borne on very short arrested lateral branchlets ; sepals broadly oblong-elliptic, rounded at apex ; petals none or minute ; fruits torulose, few-seeded :
Leaves, pedicels and calyces pubescent ; fruit softly pubescent ; sepals 5–7 mm. long 1. *crassifolia*
Leaves, pedicels and calyces quite glabrous, except for the tomentose margins of the calyx-lobes ; sepals 10–11 mm. long .. .. 2. *de-waillyi*
Leaves larger, borne on elongated shoots :
Leaves elliptic or ovate-lanceolate, mucronate, 4–6·5 cm. long, 2–3 cm. broad, long-petiolate ; sepals oblong, rounded at apex, 1·25 cm. long ; fruits elongated, torulose, with 20 or more seeds.. .. .. 3. *angolensis*
Leaves oblong-lanceolate to linear, the lower oblong, about 7·5–9 cm. long and 2 cm. broad, the upper narrower, up to about 16 cm. long and 1·5 cm. broad ; fruits short, about 4-seeded.. .. .. 4. *oblongifolia*

1. **M. crassifolia** *Forsk.*—Gilg & Benedict in Engl. Bot. Jahrb. 53 : 250 (1915) ; Chev. Fl. Viv. 1 : 164 ; Aubrév. Fl. For. Soud.-Guin. 53. *M. rigida* R.Br.—F.T.A. 1 : 86 ; Gilg & Benedict l.c. 251. *M. senegalensis* R.Br. ex A. Rich. in Guill. & Perr. Fl. Seneg. 28, t. 7 ; Chev. l.c. 165 (excl. spec. *De Wailly*). *M. trichocarpa* Gilg & Benedict l.c. 256. Tree, 20–30 ft. high, often with twisted branches and smooth bark ; in the drier savannahs and Sahara ; flowers white, sweet-scented.
Sen.: Richard Tol (Feb.) *Roger* 9 ! **Fr.Sud.:** Timbuktu (July) *Chev.* 1211 ! **Fr.Nig.:** various localities *fide* Chev. *l.c.* **N.Nig.:** Sokoto (Feb.) *Lely* 807 ! Hadeija (Mar.) *Dalz.* 141 ! Kukawa (Feb.) *E. Vogel* 63 ! Also in Mauritania and Central Sahara, and extends to Eastern Sudan, Egypt and Arabia. (See Appendix, p. 22.)
2. **M. de-waillyi** *Aubrév. & Pellegr.* in Notulae Syst. 14 : 59 (1950) ; Aubrév. Fl. For. Soud.-Guin. 53. Tree, similar to above.
Fr.Sud.: Islands of R. Niger rapids between Gao and Ansongo (Mar.) *De Wailly* 5374 !
3. **M. angolensis** *DC.*—F.T.A. 1 : 86 ; Gilg & Benedict l.c. 257 ; Chev. Fl. Viv. 1 : 165 ; Aubrév. l.c. 55. Shrub, or tree to 30 ft. high or more, in savannah ; flowers white.
Sen.: L. Guier (Panie-Foul) *Roger* 85 ! Walo *Heudelot* ! L. Cayor *Perrottet* ! **Gam.:** north bank of R.

Gambia (July) *Ozanne* 26! Kudary (Jan.) *Dalz.* 8122! **Fr.Sud.:** Bamako (May) *Hagerup* 64! And several other localities *fide* Chev. *l.c.* **G.C.:** Wiasi, N.T. (Mar.) *Vigne* 4486! Nangodi (fr. July) *Vigne* 3298! **N.Nig.:** Nupe *Barter* 1703! Katagum (Jan.) *Dalz.* 142! Sokoto *Lely* 841! Widely dispersed in tropical Africa. (See Appendix, p. 22.)

4. **M. oblongifolia** (*Forsk.*) *A. Rich.*—F.T.A. 1 : 85 ; Gilg & Benedict l.c. 260 ; Chev. Fl. Viv. 1 : 166. *Capparis oblongifolia* Forsk. (1775). *M. angustifolia* A. Rich. in Guill. & Perr. Fl. Seneg. 29, t. 8 (1830) ; Gilg & Benedict l.c. 259 ; F.W.T.A., ed. 1, 1 : 84 ; Chev. l.c. 1 : 166 ; Aubrév. Fl. For. Soud.-Guin. 55. *M. dasyura* Gilg & Benedict l.c. 259. *M. rogeoni* A. Chev. in Bull. Mus. Hist. Nat. 4 : 584 (1932). Low shrub, to 3 ft. high with thick rootstock, stiff branches and rather thick leaves; flowers white, fragrant.

Sen.: *Lelievre*! *Carrey* 48! **Fr.Sud.:** Gourma (July) *Chev.* 24365! Timbuktu (fl. & fr. Apr.) *Chudeau*! San to Donua (Mar.) *Chev.* 43970! Ségou *Rogeon*! **G.C.:** Amansare, Ashanti (July) *Chipp* 519! Bunsuru, N.T. (May) *Vigne* 3847! Tamale (Apr.) *Williams* 121! **N.Nig.:** Katagum *Dalz.* 138! Kukawa *E. Vogel* 68! Yauwa (Apr.) *Daggash* FHI 24951! Abinsi (Apr.) *Dalz.* 740! Also in Eastern Sudan to Red Sea and Arabia.

4. CAPPARIS Linn.—F.T.A. 1 : 94 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 184 (1915).

Leafless at time of flowering .. .. 1. *decidua*

Leafy at time of flowering :

Branches and leaves glabrous, or the former slightly pubescent :

Flowers solitary or paired in the axils of the leaves, or few and clustered at the end of a leafy shoot ; sepals and petals over 5 mm. long :

Petals 15–30 mm. long ; flowers on stout pedicels (2–2·5 cm. long) clustered at the end of a leafy shoot ; spines 4 mm. long, recurved :

Ovary ribbed ; petals at most emarginate ; leaves very variable in shape, from obovate through elliptic to ovate and lanceolate, base cuneate to rounded, apex sharply acuminate to obtuse, 3–14 cm. long, 1·5–5 cm. broad 2. *erythrocarpos*

Ovary not ribbed ; petals bilobed ; leaves broadly elliptic, rounded at each end, emarginate, 4·5–6 cm. long, 2·5–3·5 cm. broad .. .. .. 3. *biloba*

Petals 6–7 mm. long ; flowers on slender pedicels (3 cm. long) in leaf-axils along the shoot ; spines 3–4 mm. long, recurved ; leaves ovate, rounded at base, 4–9 cm. long, 2–4·5 cm. broad .. .. 4. *viminea*

Flowers in lax axillary simple or slightly branched racemes ; sepals and petals 2·5–3·5 mm. long ; leaves lanceolate-elliptic, emarginate or mucronate, 3–6 cm. long, 2–2·5 cm. broad, sometimes rather densely pubescent beneath 5. *thonningii*

Branches and leaves more or less tomentose :

Flowers rather small ; petals up to about 1 cm., sepals 5 mm. or less long :

Calyx glabrous :

Flowers in lax axillary simple or slightly branched racemes ; sepals 2·5–3·5 mm. long ; see above .. .. 5. *thonningii*

Flowers clustered in corymbs at the ends of short shoots ; sepals about 5 mm. long, coriaceous ; pedicels 1–1·5 cm. long ; leaves tomentose on both surfaces, oblong or oblong-lanceolate, 2–4 cm. long, obtuse or emarginate .. 6. *corymbosa*

Calyx pubescent to densely tomentose, more or less thin ; flowers 4–12 in short axillary cymes, sometimes appearing subfasciculate, pedicels 4–13 mm. long ; leaves oblong or oblong-lanceolate, rounded at each end, emarginate or apiculate, 2–4 cm. long, densely tomentose when young, glabrescent .. .. 7. *rothii*

Flowers larger ; sepals 8–10 mm. long, petals about 3 cm. long :

Pedicels and sepals very shortly grey-tomentellous ; flowers axillary along the shoots, sometimes also clustered towards the ends of the shoots ; leaves oblong-elliptic to oblong-obovate, 2–5 cm. long, 1–3 cm. broad, nerves rather obscure beneath .. .. 8. *tomentosa*

Pedicels and sepals densely yellow-brown-pubescent ; flowers corymbose at the ends of the shoots ; leaves very variable in shape, 4–7·5 cm. long, 2–4·5 cm. broad, nerves obvious and often raised beneath .. .. 9. *polymorpha*

1. **C. decidua** (*Forsk.*) *Edgew.* in J. Linn. Soc. 6 : 184 (1862) ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 203 (1915) ; Chev. Fl. Viv. 1 : 171. *Sodada decidua* Forsk. (1775). *C. aphylla* Hayne ex Roth.—F.T.A. 1 : 95. A shrub or small tree of desert regions, much branched, glabrous, with stipular spines, often leafless except on young shoots and barren branchlets.

Sen.: Salde *Heudelot* 243. **Fr.Nig.:** *fide* Chev. *l.c.* **N.Nig.:** near L. Chad *Denham & Clapperton.* Also in Mauritania and extending to Eastern Sudan, Arabia and India. (See Appendix, p. 20.)

2. **C. erythrocarpos** *Isert*—F.T.A. 1 : 98 ; Gilg & Benedict. l.c. 200 ; Chev. Fl. Viv. 1 : 172 ; Milne-Redhead in Kew Bull. 1950 : 261. *C. afzelii* DC., not of Pax. *C. warneckei* Gilg & Benedict l.c. 201 ; F.W.T.A., ed. 1, 1 : 85. A shrub, usually scandent ; common in thickets of coastal scrub and inland ; flowers white, often pink at the base of the stamens ; fruit scarlet, ribbed, 2 in. long.

Fr.G.: Boké (June) *Chillou*! **S.L.:** *Afzelius*! Ninia, Talla Hills *Sc. Elliot* 4917! Falaba (fr. Apr.) *Sc. Elliot* 5439! Mesima (fr. Apr.) *Deighton* 3701! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Accra Plains (Apr.-July) *T. Vogel*! *Moloney*! *Dalz.* 129! *Milne-Redhead* 5087! Aburi Road (Feb.) *Dalz.* 8266! Prampram (Aug.) *Vigne* 4250! **Togo:** Lome (Sept.) *Warnecke* 258! **Dah.:** *fide* Chev. *l.c.* **S.Nig.:** Ilaro (Oct.) *Onochie* FHI 13544! Extends to Congo, Angola, A.-E. Sudan, Uganda and E. Africa. (See Appendix, p. 20.)

3. **C. biloba** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 85 (1927) ; Kew Bull. 1928 : 25 ; Chev. Fl. Viv. 1 : 173. A prickly woody climber ; flowers conspicuous, pink and white.

Iv.C.: Cavally Basin, Beriby, near sea (Aug.) *Chev.* 20026. **G.C.:** Assuantsi (Sept.) *Dalz.* 160!

4. **C. viminea** *Hook. f. & Thoms. ex Oliv.* F.T.A. 1 : 97 (1868), excl. distrib. Asiat. ; Excll & Mendonça in Consp. Fl. Ang. 1 : 63. [Not *C. viminea* Hook. f. & Thoms. in Fl. Brit. India 1 : 179 (1872).] *C. welwitschii* Pax & Gilg in Engl. Bot. Jahrb. 33 : 214 (1903) ; F.W.T.A., ed. 1, 1 : 85 ; Chev. Fl. Viv. 1 : 174. *C. holliensis* A. Chev. in Bull. Soc. Bot. Fr. Mém. 8 : 137 (1912), partly. Scrambling prickly shrub ; flowers white.

Dah.: Abbo, Hollis country (Feb.) *Chev.* 22959! **N.Nig.**: Abinsi (Mar.) *Dalz.* 769! **S.Nig.**: Onitsha (Feb.) *Jones* FHI 5036! Also in Belgian Congo and Angola.

5. **C. thonningii** *Schum.*—F.T.A. 1 : 97 ; Gilg & Benedict l.c. 190 ; Chev. Fl. Viv. 1 : 173. *C. holliensis* A. Chev. in Bull. Soc. Bot. Fr. Mém. 8 : 137 (1912), partly. A prickly scrambling or climbing shrub, with dark-green leaves and white fragrant flowers ; fruit orange or red, globose or shortly cylindrical, ½–¾ in. diam.

S.L.: *Forbes*! **G.C.**: Accra (May) *Dalz.* 131! *Milne-Redhead* 5161! **Togo**: Lome (Nov.) *Mildbr.* 7499! *Warnecke* 60! 384! Sokode-Basari *Kersting* A. 728. **Dah.**: Hollis country, Pobe and Abomey (Feb.) *Chev.* 22943 ; 23160! **S.Nig.**: Abeokuta (Feb.) *Irving* 66! Ijaye to Oyo *Barter* 3326! Olokemeji (Mar.) *Meikle* 1298! (See Appendix, p. 20.)

6. **C. corymbosa** *Lam.*—F.T.A. 1 : 96 ; Chev. Fl. Viv. 1 : 174. Scrambling prickly shrub of savannah; flowers white, fruits spherical yellow.

Sen.: *Roger*! *Perrottet*! **Fr.Sud. & Fr.Nig.**: very common *fide* Chev. *l.c.* **G.C.**: Lawra *Seth Smith* 8! **N.Nig.**: Kukawa (Apr.) *E. Vogel* 90! Dumbrum (Mar.) *Foster* 30! Samae (Mar.) *Foster* 23! Zurmi (Apr.) *Keay* FHI 15848! Extends to Eastern Sudan and E. Africa. (See Appendix, p. 19.)

7. **C. rothii** *Oliv.* F.T.A. 1 : 97 ; Chev. Fl. Viv. 1 : 175. ? *C. oliveriana* Gilg in Engl. Bot. Jahrb. 33 : 216 (from Gilg's description this does not appear to be distinct from *C. rothii* Oliv., but I have not seen Gilg's type—R.W.J.K.) ; F.W.T.A., ed. 1, 1 : 185. Scrambling shrub, to 20 ft. high, similar to the preceding, but calyx silky pubescent ; petals and filaments white.

Gam.: Macarthy Isl. (Jan.) *Dalz.* 8123! **Fr.Sud.**: Ansongo, Gao (Mar.) *De Wailly* 5363! **S.L.**: *Afzelius*. **Fr.Nig.**: Zinder (Sept.) *Hagerup* 607! **N.Nig.**: Hadeija (Mar.) *Dalz.* 139! Katsina town (Apr.) *Meikle* 1366! Extends to Abyssinia and E. Africa.

8. **C. tomentosa** *Lam.*—Guill. & Perr. Fl. Seneg. 23 ; F.T.A. 1 : 96, partly (var. α) ; Gilg & Benedict l.c. 189, partly ; Chev. Fl. Viv. 1 : 175, partly. *C. puberula* DC. (1824). A thorny climbing shrub ; flowers sweet-scented, petals white, stamens pink ; fruit orange-yellow.

Sen.: *Perrottet* s.n.! 20! 21! 30! *Sieber* 32! Richard Tol *Leprieur*! Walo *Heudelot*! Dakar (Apr.) *Hagerup* 7! Thies (Feb.) *De Wailly* 4449! *Berhaut* 221! **Fr.Sud.**: R. Niger *Monod* 762! **G.C.**: Cape Coast *Brass*! Accra *Don*! **N.Nig.**: Hadeija (Mar.) *Dalz.* 137! Kukawa *E. Vogel* 22! L. Chad *Talbot* 509! 1238! Widespread in dry regions of Africa. (See Appendix, p. 20.)

9. **C. polymorpha** *Guill. & Perr.* Fl. Seneg. 24, t. 5 (1831). *C. tomentosa* of F.T.A. 1 : 96, partly (var. β) ; Gilg & Benedict l.c. 189, partly ; F.W.T.A., ed. 1, 1 : 85, partly ; Chev. Fl. Viv. 1 : 175, partly.

Sen.: M'boro *Perrottet*! *Brunner* 91! Cape Verde *Perrottet* 19! Ngazobil (May) *Berhaut* 1904! Casamance (Jan.) *Chev.* 2513! **Gam.**: *Don*! Albreda (Mar.) *Perrottet* 21! R. Gambia *Heudelot* 370! On the beach, Sukoko (Jan.) *Dalz.* 8124! Genieri (Feb.) *Fox* 29! **G.C.**: Namvilli to Pala, N.T. (Mar.) *Kitson* 967! **N.Nig.**: Plateau Prov. *Kennedy* FHI 8063! **Br.Cam.**: Buea (Jan.) *Maitland* 241! Widespread in tropical Africa.

5. **CADABA** Forsk.—F.T.A. 1 : 88 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 222 (1915).

Leaves more or less orbicular, 1–3 cm. in diam., like the branchlets glandular-setose, distinctly petiolate ; petal 1, unguiculate, oblong, about 2 cm. long 1. *glandulosa*

Leaves oblong or elliptic, up to 2·5 cm. long and 1 cm. broad, like the branchlets mealy-puberulous, very shortly petiolate ; petals 4, linear or narrowly oval, clawed 2. *farinosa*

1. **C. glandulosa** *Forsk.*—F.T.A. 1 : 89 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 225 (1915) ; Chev. Fl. Viv. 1 : 177. A low much-branched shrub ; fruit glandular-bristly, about ½ in. long.

Fr.Sud.: Goundam (Aug.) *Chev.* 2508! Tacadji (Aug.) *Chev.* 2506. **Fr.Nig.**: *fide* Chev. *l.c.* Extends to Red Sea and Arabia, Somaliland and E. Africa.

2. **C. farinosa** *Forsk.*—F.T.A. 1 : 89 ; Gilg & Benedict l.c. ; Chev. Fl. Viv. 1 : 178. A hoary shrub, branched from the base, erect or scrambling amongst other shrubs and trees ; fruits subtorulose, 1½–2½ in. long.

Sen.: Walo *Heudelot*! Dakar (Apr.) *Hagerup* 2! **Fr.Sud.**: Sebi (July) *Chev.* 1164! Gourma, Konkobiri (July) *Chev.* 24323! **G.C.**: Kubori to Mangkurugu (May) *Kitson* 504! Kumbungu (May) *Kitson* 505! Yambga (Mar.) *Vigne* 4730! **N.Nig.**: Sokoto *Ryan* 37! Katagum (Nov.) *Dalz.* 140! Near L. Chad (Dec., Jan.) *E. Vogel* 19! *Elliott* 113! All over the Sudan to the Red Sea, S. Arabia and India, and E. Africa. (See Appendix, p. 19.)

6. **CRATEVA** Linn.—F.T.A. 1 : 99.

A tree ; branches glabrous ; leaves trifoliolate, appearing after the flowers ; leaflets ovate-lanceolate, narrowed into the petiolule at the base, acutely long-acuminate, about 9 cm., rarely up to 12 cm. long, 3–5 cm. broad, thinly papery, glabrous, finely reticulate beneath ; flowers white with the stamens and sometimes the tips of the petals lilac ; fruits subglobose, stoutly long-stipitate, 4–5 cm. or more in diameter, with a hard yellow pericarp .. .. *religiosa*

C. religiosa *Forst. f.*—F.T.A. 1 : 99 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 169 (1915) ; Aubrév. Fl. For. Soud.-Guin. 45. *C. adansonii* Oliv.—F.W.T.A., ed. 1, 1 : 86 ; Chev. Fl. Viv. 1 : 179. A tree in savannah, often planted, 15 to 20 ft. or more high ; flowers appearing before the leaves, generally in February.

Sen.: *Sieber* 28! Richard Tol (May) *Döllinger* 62! Walo *Heudelot*! **Gam.**: *Saunders* 58! **Fr.Sud.**: Gao (Apr.) *De Wailly* 5379! **Fr.G.**: Kankan (May) *Chev.* 567! Kouroussa (Jan.) *Pobéguin* 643! **G.C.**: Shai Plains (Feb.) *Irvine* 1975! Accra Plains (fl. & fr. Apr.) *Bally* 57! **N.Nig.**: Ketsa, Nupe *Barter* 1103! Sokoto (Feb., Apr.) *Ryan* 33! 62! *Lely* 806! Katagum *Dalz.* 399! Bauchi Plateau (Mar.) *Lely* P. 185! Bornu (Apr.) *E. Vogel* 77! Yola (Mar.) *Dalz.* 181! **S.Nig.**: Lagos (Dec.) *Dalz.* 1149! Fiditi *Foster* 167! Widely spread throughout drier parts of tropical Africa north of the equator and in India and Burma. (See Appendix, p. 21.)

7. **RITCHIEA** R. Br.—F.T.A. 1 : 100 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 173 (1915).

*Petals numerous (8–20), generally linear or filiform ; inflorescences generally at the end of the shoots, not, or rarely, axillary along the shoots :

†Erect shrubs ; pedicels generally less than 4·5 cm. long in open flowers :

Leaves 3–5-foliolate :

Leaves generally 5-foliolate, but with some 3-foliolate leaves ; pedicels 1·5–4·5 cm. long, closely arranged in many-flowered inflorescences, bracts lanceolate, 1·5–2 cm.

long ; leaflets oblong-oblanceolate, acutely acuminate, gradually narrowed to base, 15–20 cm. long, 5–7 cm. broad .. .. 1. *pentaphylla*

Leaves 3-foliolate ; pedicels 1·5–3 cm. long :

Stamens and petals up to 5 cm. long ; lateral nerves 6–10 pairs :

Leaflets very shortly and abruptly acuminate, up to 15 cm. long and 6 cm. broad ; petals about 8 .. .. 2. *erecta*

Leaflets gradually acutely long-acuminate, 11–30 cm. long, 5–12 cm. broad ; petals about 14 .. .. 3. *polypetala*

Stamens 6 cm. long, petals 7–8 cm. long ; leaflets with 3–5 pairs of lateral nerves, oblong, 8–16 cm. long, 4–8 cm. broad, long-acuminate .. 4. *macrantha*

Leaves all simple :

Leaves coriaceous, lateral nerves deeply impressed above, very prominent beneath, markedly looped with a strong intra-marginal nerve, obovate-elliptic, 15–20 cm. long, 5–7 cm. broad ; inflorescence very shortly racemose ; pedicels about 2 cm. long .. .. 5. *simplicifolia*

Leaves thinly papery, lateral nerves slightly prominent or slightly impressed above, slightly prominent beneath ; looped with a rather weak intra-marginal nerve, oblanceolate to oblong-obovate, 18–25 cm. long, 8–10 cm. broad ; inflorescence shortly racemose ; pedicels 0·5–2·5 cm. long .. .. .. 6. *brachypoda*

† Scandent shrub or liane ; pedicels generally more than 4·5 cm. long in open flowers, inflorescences terminal on relatively short lateral branches ; leaves 3-foliolate, rarely simple ; leaflets broadly elliptic to obovate, lateral leaflets unequal at base, abruptly and very shortly acuminate, sometimes with acumen bent back, up to 16 cm. long and 7 cm. broad ; lateral nerves about 4 .. 7. *longipedicellata*

*Petals 4, generally spathulate or broadly linear, or obovate :

Petals shorter than the sepals ; sepals 5–6 mm. long ; leaves always simple, obovate to oblong-oblanceolate, acuminate, 8–12 cm. long, 3–5 cm. broad, with about 10 prominently looped lateral nerves ; pedicels slender, about 2·5 cm. long 8. *duchesnei*

Petals longer than the sepals ; sepals at least 1·5 cm. long :

Leaves 3-foliolate, sometimes with unifoliolate leaves as well (especially in *R. albersii*) :

Inflorescences axillary along the shoots as well as terminal ; scandent shrubs or lianes :

Lateral nerves 4–7 pairs, slightly raised on the upper surface, not very prominent beneath ; leaflets oblong-elliptic, up to 20 cm. long and 7 cm. broad, gradually acuminate .. .. 9. *capparoides*

Lateral nerves 2–4 pairs, impressed above, very prominent beneath ; leaflets ovate-rotundate, up to 12 cm. long and 7 cm. broad.. .. .. 10. *fragariodora*

Inflorescences terminal only ; tree or erect shrub ; leaflets ovate-oblong to elliptic, acuminate, cuneate at base, 7–14 cm. long, 2·5–6 cm. broad, 4–7 pairs of lateral nerves ; simple leaves usually present with the 3-foliolate, especially near the inflorescence .. .. 11. *albersii*

Leaves all simple or unifoliolate :

Tree or erect shrub with long-petiolate (well over 1 cm.) unifoliolate leaves and terminal many-flowered inflorescence ; see above .. .. .. 11. *albersii*

Scandent or low shrubs with simple leaves ; petiole up to 1 cm. long :

Sepals oblong, 1·5 cm. long, 5 mm. broad, acutely long-acuminate ; petals about 2·5 cm. long .. .. 12. *afzelii*

Sepals broadly oblong-ovate, 2–2·5 cm. long, about 1 cm. broad, obtusely mucronate ; petals about 5 cm. long ; leaves ovate-elliptic, obtuse and shortly mucronate at apex, rounded at base, 7–15 cm. long, 3–7 cm. broad 13. *reflexa*

1. **R. pentaphylla** *Gilg & Benedict* in Engl. Bot. Jahrb. 53 : 180 (1915). Erect shrub, flowers white.
S.Nig.: Lagos (Apr., Aug.) *Rowland* ! *Moloney* 10 ! *Punch* 27. Ilaro (May) *Millen* 102 ! Abeokuta *Barter* 3378 !

2. **R. erecta** *Hook. f.*—Gilg & Benedict l.c. 181. Erect shrub, calyx green, petals and filaments white.
F.Po: (Nov.) *T. Vogel* 227 ! Bokoko (Oct.) *Mildbr.* 6934.

3. **R. polypetala** *Hook. f.* in Bot. Mag. t. 5344 (1862), excl. distrib. Abeokuta ; Gilg & Benedict l.c. 180. *R. glossopetala* Gilg in Engl. Bot. Jahrb. 33 : 210 (1903) ; F.W.T.A., ed. 1, 1 : 87. *R. obanensis* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 86 ; Kew Bull. 1928 : 25. Erect shrub.
S.Nig.: Oban *Talbot* 58 ! Cross R. (Dec.) *Holland* 231 ! **Br.Cam.:** Victoria (Oct., Nov.) *Preuss* ! *Ludwigs* 586 ! **F.Po:** *Mann* !
[The type of *R. polypetala* Hook. f. is a specimen grown at Kew from material sent by Mann from an unspecified part of West Africa. I suggest it came from Fernando Po where Mann collected herbarium material of what is evidently the same species—R.W.J.K.]

4. **R. macrantha** *Gilg* l.c. 211 (1903) ; Gilg & Benedict l.c. 180. Erect shrub.
S.Nig.: Cross R. (July) *Johnson* ! **Br.Cam.:** Barombi *Preuss* 392 !

5. **R. simplicifolia** *Oliv.* F.T.A. 1 : 100 (1868) ; Gilg & Benedict l.c. 183. A shrub in forest, 4–6 ft. high.
Br.Cam.: Cameroons R. (Jan.) *Mann* 2190 ! Also in French Cameroons and Spanish Guinea.

6. **R. brachypoda** *Gilg* in Engl. Bot. Jahrb. 33 : 213 (1903). Erect shrub, to 2 ft. high, in dense forest ; petals white, stamens pale bluish-green.
Br.Cam.: Barombi, between Mafura and Mambanda (Dec.) *Preuss* 50 ! S. Bakundu F.R. (Jan.) *Keay* FHI 28557 !

7. **R. longipedicellata** *Gilg* l.c. 211 (1903) ; Gilg & Benedict l.c. 181 ; Chev. Fl. Viv. 1 : 182. Scandent shrub, calyx green, petals and stamens cream ; fruit 2–2½ in. long.
Togo: Afern *Kersting* A. 564. **Dah.:** *fide* Chev. *l.c.* **S.Nig.:** Lagos, Ikoyi Plains (Feb.) *Dalz.* 1150 ! Ebute Metta (Oct.) *Millen* 8 ! Near Abeokuta (Jan.) *Irving* 153 ! *Rowland* ! *Millson* ! *Russell* FHI 25655 ! Ibadan (Dec.) *Meikle* 906 ! Ubulubu, Asaba Div. (Feb.) *Thomas* 2322 !

8. **R. duchesnei** (*De Wild.*) *Keay* in Kew Bull. 1952 : 161, t. 2. *Capparis duchesnei* De Wild. in Miss. Laurent 1 : 87 (1905). *Capparis afzelii* Pax in Engl. Bot. Jahrb. 14 : 299 (1891), not of DC. (1824) ; Gilg & Benedict l.c. 199 ; F.W.T.A., ed. 1, 1 : 85 ; Chev. Fl. Viv. 1 : 170. A small tree, or shrub, in forest, with smooth red-brown bark and shining leaves ; petals white, turning reddish, stamens red ; fruit ellipsoid, 1–1½ in. long.
S.L.: *Afzelius* ! Benna (Jan.) *Sc. Elliot* 5433 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Atrokpe, Krobo (Nov.) *Irvine* 1703 ! Ejan, N. Agogo (Jan.) *Vigne* 1783 ! **Dah.:** Hollis country, between Masse and Ketou (Feb.) *Chev.* 23010 ! **S.Nig.:** Lagos *Foster* 56 ! Olokemeji (Nov.) *Jones* FHI 4937 ! **Br.Cam.:** Barombi (Sept.) *Preuss* 545 ! *Staudt* 765. Also from French Cameroons to A.-E. Sudan, Uganda and Belgian Congo.

9. **R. capparoides** (*Andr.*) *Britten* in J. Bot. 55 : 279 (1917). *Crateva capparoïdes* Andr. Bot. Rep. t. 176 (1801). *Crateva fragrans* Sims in Bot. Mag. t. 596 (1802). *R. fragrans* (Sims) R. Br.—F.T.A. 1 : 101, partly (excl. syn.) ; Gilg & Benedict l.c. 176 ; F.W.T.A., ed. 1, 1 : 87 ; Chev. Fl. Viv. 1 : 181. Scandent shrub or liane to 20 ft. high ; calyx bright green, petals pale green, filaments white.
Sen.: Badioure to Bignona (Feb.) *Chev.* 2509 ! **Port.G.:** Pussube (Mar.) *Esp. Santo* 1147 ! **S.L.:** Bunce Isl. (Mar.) *Kirk* 31 ! Rowala (fr. July) *Thomas* 1206 ! Njala (Mar.) *Deighton* 1934 ! Yoni, Bonthe Isl. (Mar.) *Deighton* 2467 ! Newton (fr. May) *Deighton* 2756 ! **Lib.:** Monrovia *Whyte* ! Grand Bassa *Dinklage* 1937. **Iv.C.:** *fide* Chev. *l.c.* **Togo:** Boto *Busse* 3628. **Dah.:** *Burton* ! **S.Nig.:** Lagos *Foster* 72 ! Otta *Barter* 3377 ! **Br.Cam.:** S. Bakundu F.R. (Mar.) *Brenan* 9429 ! Also in French Cameroons, Gabon and Kenya.

10. **R. fragariodora** *Gilg* in Engl. Bot. Jahrb. 33 : 207 (1903) ; Gilg & Benedict l.c. 176. Scandent shrub 15–20 ft. high.
S.Nig.: Eket *Talbot* 3147 ! Degema *Talbot* ! Calabar (Feb.) *Mann* 2263 ! Also in French Cameroons and Angola.

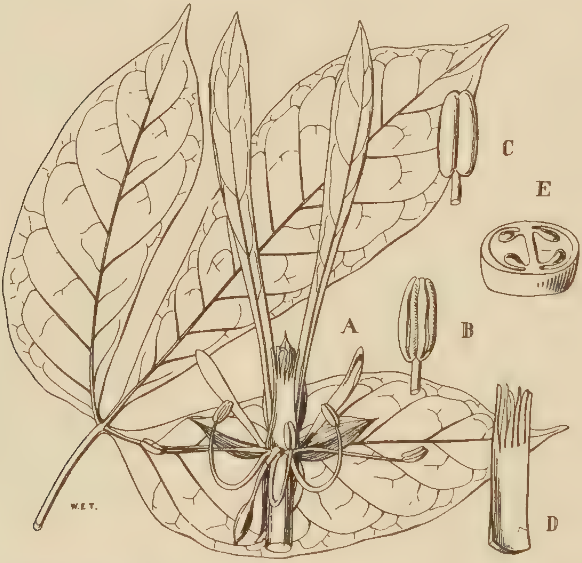

FIG. 28. — EUADENIA EMINENS *Hook. f.* (CAPPARIDACEAE).

A, flower.
B, anther.
C, anther from behind.
D, erect appendage composed of staminodes.
E, cross-section of ovary.

11. **R. albersii** *Gilg* l.c. 208 (1903) ; Gilg & Benedict l.c. 178. *R. macrocarpa* Gilg l.c. ; F.W.T.A., ed. 1, 1 : 87. Tree, to 35 ft. high, in forest ; calyx green, petals pale green, stamens yellow ; fruit ovoid, up to 2½ in. long.
S.Nig.: Ikwette Plateau, Obudu, 5,200 ft. (Dec.) *Keay & Savory* FHI 25212 ! **Br.Cam.:** Buea, 3,000–3,200 ft. (fl. Jan., fr. Apr., May) *Lehmbach* 180 ! 223 ! *Maitland* 188 ! 716 ! Also widespread in eastern Africa.

12. **R. afzelii** *Gilg* l.c. 212 (1903) ; Gilg & Benedict l.c. 183 ; Chev. Fl. Viv. 1 : 183. Shrub with slender erect shoots, to 18 in. high.
Fr.G.: Diaragouela (Feb.) *Chev.* 477. **S.L.:** *Afzelius.*

13. **R. reflexa** (*Thonn.*) *Gilg & Benedict* l.c. 183 (1915) ; Chev. Fl. Viv. 1 : 182. *Capparis reflexa* Thonn.—F.T.A. 1 : 98. *Maerua grandiflora* Pax (1892). *R. grandiflora* (Pax) Gilg (1903). Scandent shrub, flowers cream.
Fr.G.: Kouroussa (Feb.) *Chev.* 365. **G.C.:** Accra (fl. Jan.–Mar., fr. Apr.) *Dalz.* 130 ! *Milne-Redhead* 5056 ! Shai Plains (Jan.) *Johnson* 562 ! Akroful *Cummins* 21 ! Assuantsi (Feb.) *Dalz.* 8295 ! Adafo (Nov.) *Krause* ! **Togo:** Lome (Nov.) *Warnecke* 61 ! *Mildbr.* 7508 ! Akepe *Busse* 3262. Ho *Schröder* 202. (See Appendix, p. 22.)

8. EUADENIA Oliv.—F.T.A. 1 : 90.

Racemes short and subcorymbose ; pedicels stout, 5–6 cm. long ; leaflets subsessile, about 15 cm. long ; petals yellow ; fruits unequally torulose, 15–30 cm. long, 6–10 mm. in diam. .. .. 1. *eminens*

Racemes elongated ; pedicels slender, not more than 3 cm. long ; leaflets distinctly petiolulate :

Larger petals up to 6 mm. broad, 3·5–8 cm. long, green, turning red ; sepals 7–12 mm. long ; leaflets acuminate, long-petiolulate, up to about 15 cm. long, variable in shape ; fruit cylindrical, not torulose, about 5 cm. long and 1·8 cm. in diam. 2. *trifoliolata*

Larger petals up to 2 cm. broad, up to 8 cm. long, broadly oblanceolate, yellow with conspicuous red veins ; leaflets broadly obovate, long-acuminate, up to 17 cm. long and 7 cm. broad, very long petiolate, but petiolules less than 1 cm. long ; fruit not known .. .. 3. *pulcherrima*

1. **E. eminens** *Hook. f.* Bot. Mag. t. 6578 (1881) ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 170 (1915) ; Chev. Fl. Viv. 1 : 183. *E. major* Hua—Chev. Bot. 32. A branching rather soft-wooded shrub, 2–5 ft. high, with strong odour.

   S.L.: *Smeathmann* ! Bagroo R. *Mann* 872 ! Kukuna, Scarcies R. (Jan.) *Sc. Elliot* 4758 ! Waterloo (Oct.) *Lane-Poole* 299 ! Mamaka (fr. Nov.) *Thomas* 4411 ! Juring (Dec.) *Deighton* 304 ! **Lib.:** Grand Bassa *Dinklage* 1622. Sinoe Basin *Whyte* ! Ganta (Apr.) *Harley* ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Adija (May) *Chipp* 430 ! Kwahu Plateau (May) *Kitson* 1181 ! Amentia *Irvine* 534 ! (See Appendix, p. 21.)

2. **E. trifoliolata** (*Schum. & Thonn.*) *Oliv.* F.T.A. 1 : 91 (1868), partly ; Gilg & Benedict l.c. ; Chev. Fl. Viv. 1 : 170 ; Aubrév. Fl. For. C. Iv. 1 : 134, t. 47. *Stroemia trifoliolata* Schum. & Thonn. (1827). *Pteropetalum klingii* Pax (1891). *Euadenia monticola* Gilg & Benedict l.c. ; F.W.T.A., ed. 1, 1 : 87. Shrub, 6–12 ft. high.

   Iv.C.: Banco *Aubrév.* 457 ! **G.C.:** *Thonning. Johnson* 104 ! Koforidua (July) *Vigne* 4416 ! **Togo:** Bismarckburg (June) *Kling* 63 ! **S.Nig.:** Lagos (Aug.) *Lamborn* 23 ! *Foster* 196 ! *Rowland* ! Abeokuta *Barter* 3386 ! Epe (Feb.) *Millen* 169 ! Sobo Plains (Mar.) *Freeman* 306 ! Calabar (Feb.) *Mann* 2276 ! Degema *Talbot* ! **Br.Cam.:** Buea (Nov.-Jan.) *Diestel* 122 ! *Maitland* 315 ! Cam. Mt., 3,000 ft. (Feb.) *Mann* 1178 ! Bonakanda (Dec.) *Maitland* 1213 ! (See Appendix, p. 21.)

3. **E. pulcherrima** *Gilg & Benedict* l.c. 171 (1915). Shrub, to 6 ft.

   Br.Cam.: Likomba (Nov.) *Mildbr.* 10626 ! Also in French Cameroons.

9. BUCHHOLZIA Engl. Bot. Jahrb. 7 : 335 (1886) ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 213 (1915).

Branchlets stout, glabrous ; leaves elongate-obovate or elliptic, shortly acuminate, 18–27 cm. long, 8–10 cm. broad, thinly coriaceous, glabrous ; midrib very prominent beneath ; lateral nerves about 10, arcuate, looped, prominent beneath ; veins very lax ; petiole up to 12 cm. long, swollen for about 1 cm. at the apex ; racemes axillary, simple or slightly branched, up to 15 cm. long ; pedicels 0·5–1 cm. long ; bracts small, hook-like ; flowers about 1·5 cm. long ; sepals broad, 3 mm. long ; stamens numerous ; fruit ellipsoid, about 9 cm. long, 6 cm. broad, with thick woody endocarp about 8 mm. thick ; seeds 2–3, about 2·5 cm. diam. with flattened sides ; stipes 1·5 cm. long, stout .. .. *coriacea*

B. coriacea *Engl.* Bot. Jahrb. 7 : 335 (1886) ; Pax in Engl. Bot. Jahrb. 14 : 301, t. 4 ; Chev. Fl. Viv. 1 : 186. *B. macrophylla* of Chev. Bot. 29, not of Pax. *B. engleri* Gilg (1903). Evergreen understorey tree of forest, 30–60 ft. high ; slash deep red ; flowers cream ; fruits yellowish when ripe ; seeds blackish, spicy-tasted.

Fr.G.: Nzérékoré *Jac.-Fel.* 1141 ! **S.L.:** Dodo (planted) (fr. Apr.) *Deighton* 3914 ! Kambui Hills *Sawyerr* FHN 13563 ! **Iv.C.:** Alepé (Mar.) *Chev.* 16238 ! Abidjan (Nov.) *Aubrév.* 162 ! **G.C.:** Atroni (Aug.) *Vigne* 2439 ! Pamu, Berekun F.R. (Sept.) *Vigne* 2494 ! **S.Nig.:** Akure F.R. (Nov.) *Keay* FHI 25536 ! Sapoba (June) *Kennedy* 1661 ! Eket *Talbot* 3368 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 764 ! Also in French Cameroons and Gabon. (See Appendix, p. 19.)

10. BOSCIA Lam.—F.T.A. 1 : 91 ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 203 (1915).

Leaves elongate-lanceolate or linear, willow-like, very acute, up to 12 cm. long, 1–1·5 cm. broad, midrib prominent beneath and often straw-coloured, with rather obscure ascending lateral nerves ; inflorescence densely racemose, usually leafless, shortly tomentose ; fruit smooth and shining, 1–1·25 cm. in diam. .. 1. *salicifolia*

Leaves shortly lanceolate or oblong-lanceolate, up to 5 cm. long, 1–1·5 cm. broad, mucronate to retuse, very finely and closely reticulate, glabrous ; inflorescence accompanied by the leaves, shortly racemose, slightly pubescent, terminating short leafy branchlets ; fruit pitted and rugulose, globose, 1–1·25 cm. in diam. 2. *angustifolia*

Leaves elliptic to ovate-elliptic, obtuse or mucronate, up to 9 cm., very rarely up to 14 cm. long, 2–4 cm. broad, with about 5–6 lateral nerves raised on both surfaces and prominently looped, distinctly reticulate, glabrous or more usually finely pubescent ; racemes accompanied by the leaves, short, crowded, corymbose, thinly pilose ; fruit globose, 1–1·5 cm. in diam., warted and sometimes slightly tomentellous 3. *senegalensis*

1. **B. salicifolia** *Oliv.* F.T.A. 1 : 93 (1868) ; Gilg & Benedict in Engl. Bot. Jahrb. 53 : 211 (1915) ; Chev. Fl. Viv. 1 : 190 (incl. var. *nivea* A. Chev.) ; Aubrév. Fl. For. Soud.-Guin. 47. Savannah tree, up to 40 ft. high with graceful drooping foliage.

   Sen.: Kounoun *Trochain* 1150. **Fr.Sud.:** Gourma *Chev.* 24456. **Iv.C.:** Bouzoum *Aubrév.* 2681. **G.C.:** Nebiowalli, Guo Hills (May) *Kitson* 508 ! **N.Nig.:** Sokoto (Jan.) *Gillman* 2 ! Zurmi (fr. Apr.) *Keay* FHI 16165 ! Yola (Feb.) *Dalz.* 182 ! Extending to the Red Sea ; widespread in E. Africa, and extending to Bechuanaland. (See Appendix, p. 18.)

2. **B. angustifolia** *A. Rich.* in Guill. & Perr. Fl. Seneg. 26, t. 6 (1830) ; F.T.A. 1 : 92 ; Gilg & Benedict l.c. 210 ; Chev. l.c. 1 : 189 ; Aubrév. l.c. 49. *B. tenuifolia* A. Chev. l.c. 190 (fide Aubrév. l.c.). Shrub or small tree of savannah, to 25 ft. high, with glabrous branches ; flowers greenish, fragrant.

   Sen.: Walo and Bondou *Heudelot* 361 ! Tivaouane (Dec.) *Chev.* 2499 ! Thies (Dec.) *Chev.* 2501 ! **Fr.Sud.:** Koulikoro (Oct.) *Chev.* 2511. Ouacoro (Oct.) *Chev.* 2497 ! **Fr.Nig.:** *fide* Chev. *l.c.* **N.Nig.:** Sokoto to Birnin Kebbi (Oct.) *Dalz.* 381 ! Lema F.R., Argungu (Nov.) *Jibrin* FHI 5152 ! Nupe *Barter* 1730 ! Jebba (Dec.) *Hagerup* 749*a* ! Throughout the Sudan to Abyssinia and S. Arabia. (See Appendix, p. 18.)

3. **B. senegalensis** (*Pers.*) *Lam. ex Poir.*—F.T.A. 1 : 92 ; Gilg & Benedict l.c. 209 ; Chev. Fl. Viv. 1 : 187 ; Aubrév. l.c. 49. *Podoria senegalensis* Pers. (1806). *B. octandra* Hochst. ex Radlk. (1884) ; Chev. l.c. 188. Shrub or small tree of savannah.

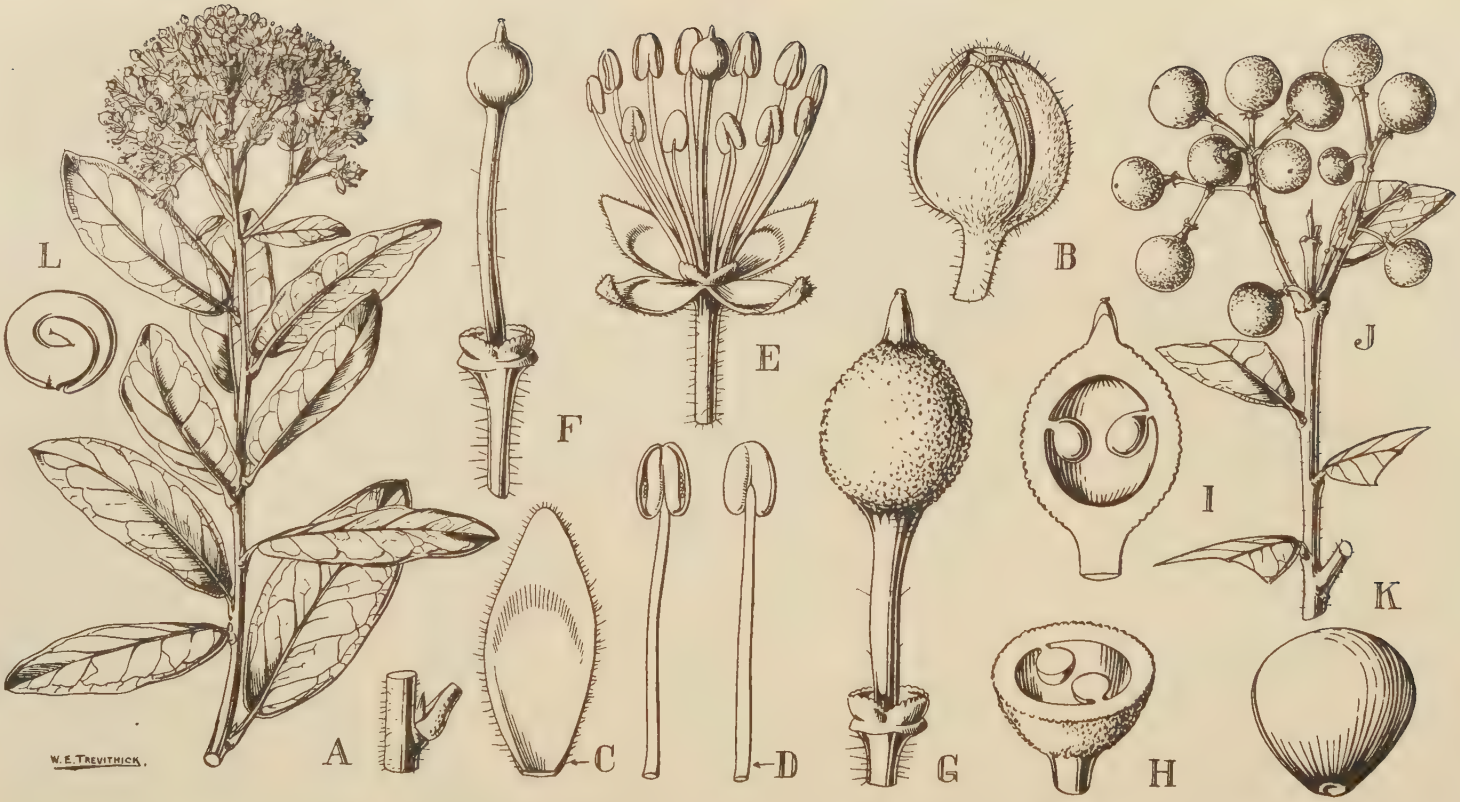

Fig. 29.—**Boscia senegalensis** (*Pers.*) *Lam. ex Poir.* (Capparidaceae).

A, petiole with axillary bud. B, flower-bud. C, sepal. D, stamens, front and back. E, flower. F, ovary with gynophore and disk. G, the same in fruit. H, cross-section of fruit. I, vertical section of same. J, fruiting branch. K, seed. L, embryo.

Sen.: Dakar (Dec.) *Vigne* 1772! *Debeaux* 149! And many other localities *fide* Chev. *l.c.* **Fr.Sud.:** San (fr. June) *Chev.* 1071! Djinyin (Aug.) *Chev.* 2495! And many other localities *fide* Chev. *l.c.* **Fr.Nig.:** Zinder (Oct.) *Hagerup* 574*a*! Birnin Kebbi (Oct.) *Dalz.* 381*a*! Sabon Birni (Dec.) *Ryan* 64! Sokoto *Lely* 851! Katagum *Dalz.* 143! Kukawa (Apr.) *E. Vogel* 93! Also in Mauritania and extends to Eastern Sudan and Abyssinia. (See Appendix, p. 19.)

11. COURBONIA Brongn.—F.T.A. 1: 87; Gilg & Benedict in Engl. Bot. Jahrb. 53: 216 (1915).

A glaucous glabrous shrub ; branches long and slender, leafy, ribbed ; leaves lanceolate to elliptic, acutely acuminate, 2–3 cm. long, almost sessile, mostly obscurely 3-nerved ; flowers solitary, axillary ; pedicel 2 cm. long ; sepals united at the base, free part ovate, about 1 cm. long, acute ; fruits ovoid or ellipsoid, beaked, 2 cm. long, long-stipitate, smooth .. .. *virgata*

C. virgata *Brongn.*—F.T.A. 1: 88; Gilg & Benedict in Engl. Bot. Jahrb. 53: 217 (1915); Chev. Fl. Viv. 1: 192. *C. pseudopetalosa* Gilg & Benedict l.c.; F.W.T.A., ed. 1, 1: 89. A low shrub or undershrub, 1–2 ft. high, with straight branches from a woody rhizome, smelling of dung ; flowers greenish-white ; stamens white.

Sen.: Ferlo *Heudelot* 158! **Fr.Sud.:** Gourma (July) *Chev.* 24332. **G.C.:** Bele Plateau (May) *Kitson* 789! Bunsuru (May) *Vigne* 3846! **N.Nig.:** Bornu (Nov.-Feb.) *Elliott* 131! *Talbot* 1217! Yola (Jan.) *Dalz.* 180! Extends to Uganda, A.-E. Sudan, Somaliland and Abyssinia.

18. MORINGACEAE

Trees with gummy bark. Leaves deciduous, alternate, 2–3 times pinnate, pinnae opposite ; stipules none, or represented by stipitate glands at the base of the petioles and pinnae. Flowers in axillary panicles, white or red, hermaphrodite, zygomorphic. Calyx-tube short, with 5 unequal spreading or reflexed lobes, the fifth posticous, imbricate. Petals 5, the two upper smaller, the lateral ones ascending, the anticous larger. Disk lining the calyx-tube, with a short free margin. Stamens inserted on the margin of the disk, declinate, 5 perfect, alternating with the same number of antherless stamens or reduced to setae ; filaments free ; anthers dorsifixed, 1-celled, opening lengthwise by a slit. Ovary stipitate, terete, villous, curved, 1-celled, with 3 parietal placentas ; style terminal, slender, tubular, truncate at the apex ; ovules numerous, in 2 series on each placenta. Capsule long, beaked, 3–6-angled, torulose, 1-celled, 3-valved. Seeds 3-winged or not ; embryo without endosperm, straight.

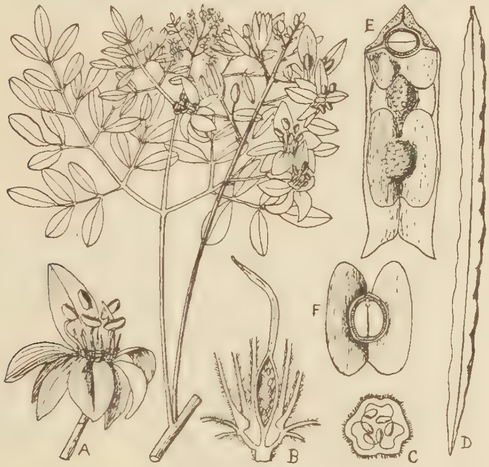

Fig. 30.—Moringa oleifera *Lam.* (Moringaceae).

A, flower.
B, longitudinal section of flower.
C, cross-section of ovary.
D, fruit.
E, portion of fruit opened.
F, seed.
After Volkens.

Natives of India and Arabia, but now introduced into the tropics generally. Easily recognized by the compound-pinnate leaves, zygomorphic flowers, shortly stipitate ovary with parietal placentas, and the long fruit and winged seeds.

MORINGA Adans.—F.T.A. 1: 101.

A tree with soft wood and pale bark ; leaves 2–3-pinnate ; rhachis softly pubescent ; leaflets opposite, up to about 5 pairs, the terminal one larger, all more or less elliptic, rounded at each end, shortly petiolulate, 1–2 cm. long, glaucous beneath and very slightly pubescent ; flowers white, paniculate ; calyx-tube campanulate, lobes 5, longer than the tube, finely pubescent ; petals unequal, slightly longer than the sepals ; fruit 3-angled, elongate-linear, about 1 ft. long ; seeds globose, with 3 membranous wings produced beyond the ends .. .. *oleifera*

M. oleifera *Lam.* Encyl. 1 : 398 (1785) ; Pax in E. & P. Pflanzenfam. 17B : 697 (1936). *M. pterygosperma* Gaertn. (1791)—F.T.A. 1 : 101 ; F.W.T.A., ed. 1, 1 : 90 ; Chev. Fl. Viv. 1 : 194. Native of India, cultivated all over the tropics.
Sen.: *Roger*! St. Louis *Brunner*! Djoloff (Feb.) *Dubai* 275! **Fr.Sud., Fr.Nig. & Dah.:** *fide* Chev. *l.c.* **S.L.:** between Tombo and Kent (May) *Deighton* 2754! **G.C.:** Yendi and Wa (Feb.) *McLeod* 813! 821! **N.Nig.:** Bauchi Plateau (Mar.) *Lely* P. 194! **S.Nig.:** Lagos (Sept.) *Punch* 20! *Dawodu* 39! Obu *Thomas* 63! (See Appendix, p. 23.)

19. CRUCIFERAE

Annual or perennial herbs, rarely somewhat shrubby, with watery juice. Indumentum of simple, medifixed or stellate hairs, rarely glandular. Leaves alternate or rarely opposite ; stipules absent. Flowers hermaphrodite, mostly actinomorphic, usually racemose, rarely bracteate. Sepals 4, free, imbricate in 2 series, rarely valvate. Petals 4, rarely 0, mostly equal, often long-clawed, imbricate or contorted. Glands mostly present on the torus, often opposite the sepals. Stamens 6, tetradynamous, very rarely numerous or fewer, free or connate in parts ; anthers 2- (rarely 1-) celled, opening lengthwise. Ovary sessile or rarely stipitate, usually of 2 united carpels, 1-celled with 1–2 parietal placentas and divided by a spurious membranous septum, or sometimes transversely several- or many-celled ; stigmas 2, free or connate ; ovules usually many. Fruit elongated (siliqua) or short (silicule), bivalved or indehiscent, rarely transversely jointed. Seeds without endosperm (very rarely a little endosperm present) ; embryo usually folded ; cotyledons accumbent or incumbent.

A large natural family widely spread throughout the world, but poorly represented in our area. At once recognized by the herbaceous habit, four sepals and petals, and six stamens, four of which are longer and two shorter (tetradynamous).

Indumentum of stellate or medifixed hairs :
  Indumentum of stellate hairs ; seeds thick, not winged .. .. 1. **Eremobium**
  Indumentum of appressed medifixed hairs ; seeds compressed, broadly winged 2. **Farsetia**
Indumentum of simple hairs, or glabrous :
  Fruits linear, much longer than broad :
    Fruits with a strongly marked midrib between the sutures .. 3. **Brassica**
    Fruits without a distinct midrib between the sutures :
      Seeds usually in 2 series ; fruit comparatively short ; leaves pinnately divided 4. **Rorippa**
      Seeds in a single series ; fruits rather elongate ; leaves pinnately partite or trifoliolate .. .. 5. **Cardamine**
  Fruits nearly as broad as long, more or less elliptic and winged :
    Fruits small, narrowly winged only towards the apex ; leaves much divided into linear segments ; seeds subturgid .. .. 6. **Lepidium**
    Fruits fairly large, broadly winged all round ; leaves deeply cordate and amplexicaul at the base, entire ; seeds flattened .. .. 7. **Schouwia**

1. EREMOBIUM Boiss.—O. E. Schulz in E. & P. Pflanzenfam. 17B : 570 (1936).

Annual or perennial herb, woody at the base, prostrate or ascending, forming compact clumps to 30 cm. high ; stems and narrowly oblong entire leaves densely white stellate-pubescent ; flowers in dense racemes, sepals about 5 mm. long, exceeded by the pink petals ; fruits 2–3 cm. long, pubescent, somewhat constricted between the seeds *aegyptiacum*

E. aegyptiacum (*Spreng.*) *Hochr.* in Ann. Conserv. Jard. Bot. Genèv. 7–8 : 159 (1904) ; Burtt & Lewis in Kew Bull. 1949 : 287. *Malcolmia aegyptiaca* Spreng.—Chev. Fl. Viv. 1 : 217.
Fr.Nig.: Tabello *Petit-Lagrange* 55. Agades to Tintaouine *Chev.* 43484. Tasolé *Chev.* 43515. Also in Mauritania, Sahara, N. Africa, Egypt, Palestine and Arabia.

2. FARSETIA Turra—F.T.A. 1 : 61.

Petals about 6 mm. long, slightly longer than the 4–5 mm. long pubescent sepals ; flowers few in lax racemes ; fruits oblong with sinuate margins up to 2·5 cm. long, rather densely covered with appressed medifixed hairs, 4–5 seeded, beaked with the persistent style ; stems rather woody, densely covered with closely appressed medifixed hairs, leaves linear, obtuse, entire, 1-nerved, 4–5 cm. long, up to 5 mm. broad, usually less, covered on both surfaces with long appressed medifixed hairs 1. *ramosissima*

Petals about 2 cm. long, sepals about 1 cm. long with membranous margins ; flowers in elongated racemes ; fruits linear with nearly straight margins, distinctly 1-nerved, about 4 cm. long, rather thinly pubescent with appressed hairs, beaked ; leaves up to 8 cm. long and 5 cm. broad .. .. 2. *stenoptera*

1. **F. ramosissima** *Hochst. ex Fourn.*—F.T.A. 1 : 63 ; Chev. Fl. Viv. 1 : 222. Pale green twiggy herb ; flowers white.
Fr.Sud.: Larneb *Monod* 4033. Goundam (Aug.) *Chev.* 2554 ! Timbuktu (July) *Hagerup* 178 ! **Fr.Nig.:** several localities *fide* Chev. *l.c.* **N.Nig.:** L. Chad : Kalkala *Golding* 70 ! Baga (Jan.) *Daggash* FHI 24965 ! Extends to the A.-E. Sudan. (See Appendix, p. 24.)

2. **F. stenoptera** *Hochst.* in Flora 31 : 176 (1848) ; F.T.A. 1 : 62. *F. grandiflora* Fourn. in Bull. Soc. Bot. Fr. 11 : 55 (1864) ; F.T.A. 1 : 62 ; Chev. Fl. Viv. 1 : 220, incl. var. *apiculata* A. Chev. (petals pure white, oblong-apiculate). Erect herb, flowers pink.
Fr.Sud.: Ouahigouya (Aug.) *Chev.* 24736 ! Yatenga (Aug.) *Chev.* 24776 ! **Fr.Nig.:** Adrar Doutchi *Chev.* 43259 (type of var. *apiculata*). Tinkademi *Arnaud.* Yatakala to Tillabery *Rogeon* 501. Extends to the A.-E. Sudan.

3. **BRASSICA** Linn.—F.T.A. 1 : 65 ; O. E. Schulz in Engl. Pflanzenr. Crucif. 21 (1919).

Cauline leaves amplexicaul, entire ; plant entirely glabrous and glaucous ; petals yellow, 7·5–18 mm. long ; fruit 3–5 cm. long ; roots tuberculate 1. *napus* var. *sahariensis*

Cauline leaves sessile or petiolate, not amplexicaul ; plants with strong taproot :

Flowers relatively large, petals obovate, 6·5–12 mm., sepals 3·5–6 mm. long ; leaves glabrous or glabrescent :

Basal leaves deeply lobed at the base, coarsely and irregularly dentate, lyrate ; upper cauline leaves oblanceolate, entire or nearly so ; fruit about 3 cm. long and 2–3·5 mm. broad, 4-ribbed and distinctly nervose, beaked with persistent style 2. *juncea*

Basal leaves not deeply lobed or only with small lobes on the petiole, both basal and upper leaves irregularly crenate ; otherwise similar to above .. 3. *integrifolia*

Flowers smaller, petals narrowly oblong-obovate, 5–7 mm., sepals 3 mm. long ; leaves and stems bristly pubescent with rigid hairs ; basal leaves in a rosette, several times deeply pinnatifid .. .. 4. *tournefortii*

1. **B. napus** *Linn.* var. **sahariensis** A. Chev. in Rev. Bot. Appliq. 1932 : 829 ; Fl. Viv. 1 : 208. Cultivated in Sahara and French Sudan.
Fr.Sud.: Timbuktu *Chev.* 43809 ; 43838. Gao *Chev.* 43053.

2. **B. juncea** (*Linn.*) *Coss.* in Bull. Soc. Bot. Fr. 6 : 609 (1859) ; F.T.A. 1 : 65 ; Chev. Fl. Viv. 1 : 209. *Sinapis juncea* Linn. (1753). Erect herb to 3 ft. high ; flowers yellow ; introduced from north temperate regions of Old World, now widely cultivated and naturalized in the tropics as Indian Mustard.
Fr.G.: Kankan (Mar.) *Chev.* 592 ! Faraba (Jan.) *Chev.* 281. Konianke country (Feb.) *Chev.* 20825. **S.L.:** Regent (Dec.) *Sc. Elliot* 3984 ! Magbile (Dec.) *Thomas* 5913 ! 5933 ! Port Loko (Sept.) *Glanville* 408 ! (See Appendix, p. 23.)

3. **B. integrifolia** (*West*) *O. E. Schulz* in Urb. Symb. Antill. 3 : 509 (1903) ; Chev. Fl. Viv. 1 : 210. *Sinapis integrifolia* West (1793). *B. integrifolia* var. *chevalieri* Portères in Rev. Bot. Appliq. 1935 : 1120, with fig. Glabrous herb, to 3 ft. high, with pale yellow flowers. Cultivated and widespread in Asia, Africa and America.
Iv.C.: Man *Chev.* 34180.

4. **B. tournefortii** *Gouan*—F.T.A. 1 : 66 ; Chev. Fl. Viv. 1 : 209. Herb to 2 ft. high with small cream flowers.
Sen.: Podor *Chev.* 25748. **Fr.Nig.:** Air *Rogeon* in *Hb. Chev.* 43382. Also in Sahara, north and east Africa, S. Europe and western Asia.

Besides the above, several varieties of *B. oleracea* Linn. (Cabbages, etc.), *B. campestris* Linn. (Turnips) and *B. rapa* Linn. (Rapes) are cultivated in our area ; other species may also occur in cultivation or as aliens.

4. **RORIPPA** Scop.—Hylander in Bot. Notiser. 1950, 1 : 1–13 (1950) ; *Nasturtium* R. Br.—F.T.A. 1 : 57.

Stem very short, plant almost acaulescent with rosette of prostrate, irregularly pinnate leaves up to 20 cm. long ; leaflets ovate or orbicular, toothed or sinuate ; flowers very small, sepals 1–1·3 mm. long, petals smaller ; fruits 4–14 mm. long 1. *humifusa*

Stem well-developed, to 40 cm. high or more, hollow ; leaves pinnate with about 4 pairs of narrowly ovate leaflets, oblique and unequal at base, obtuse at apex, margin irregularly sinuate ; sepals 2·5–3 mm. long, petals considerably longer ; fruits 1–2 cm. long, seeds in two ranks, the testas with rather coarse aerolation 2. *nasturtium-aquaticum*

1. **R. humifusa** (*Guill. & Perr.*) *Hiern* in Cat. Welw. 1, p. xxvi (1896) ; Brenan in Kew Bull. 1950 : 212. *Nasturtium humifusum* Guill. & Perr.—F.T.A. 1 : 58 ; F.W.T.A., ed. 1, 1 : 92 ; Chev. Fl. Viv. 1 : 213. *Nasturtium benuense* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 92 (1927) ; Kew Bull. 1928 : 26. *Cardamine hirsuta* of A. Chev. in Comptes Rendus 1909, 2 : 459, not of Linn. Low annual herb on sandy ground by water.
Sen.: Walo (Nov.-Mar.) *Perrottet* ! *Heudelot* 195 ! **Iv.C.:** Sanrou (May) *Chev.* 21585 ! Anno (Dec.) *Chev.* 22538. Comoe valley (Dec.) *Chev.* 22552. **G.C.:** R. Birrim, Anyinam (Mar.) *Irvine* 1756 ! **N.Nig.:** Abinsi (Apr.) *Dalz.* 746 ! **S.Nig.:** R. Awaran, Ife (fl. & fr. Jan.) *Brenan & Onochie* 8983 ! Idanre (fl. & fr. Jan.) *Brenan & Jones* 8733 ! Also in Belgian Congo, Angola, Uganda and Madagascar.

2. **R. nasturtium-aquaticum** (*Linn.*) *Hayek* Sched. Fl. Stir. Exs. 22 (1905) ; Hylander in Bot. Notiser. 1950, 1 : 1–13 (1950). *Sisymbrium nasturtium-aquaticum* Linn. (1753). *Nasturtium officinale* R.Br.—F.T.A. 1 : 58 ; Chev. Fl. Viv. 1 : 212. The Common Watercress, introduced to, and naturalized in, certain localities within our area ; flowers white.
Fr.Sud.: Timbuktu *fide* Chev. *l.c.* **Fr.Nig.:** Agades *fide* Chev. *l.c.* **Br.Cam.:** Cam. Mt., below Musake hut 5,500 ft. (Nov., Jan.) *Migeod* 52 ! *Keay* FHI 28581 !

[The above description is based on the Cameroons' plant.]

5. **CARDAMINE** Linn.—F.T.A. 1 : 60 ; O. E. Schulz in Engl. Bot. Jahrb. 32 : 280–623 (1902).

Leaves trifoliate, long-petiolate, up to 16 cm. long including the petiole ; leaflets ovate, acute, coarsely crenate-dentate, with distinct petiolules about 1 cm. long, setulose-pubescent on both surfaces ; petals present, 3–5 mm. long ; pedicels up to 1 cm. long in fruit ; fruits 2·5–4·5 cm. long .. .. 1. *africana*

Leaves pinnate ; fruits 1·2–3 cm. long :

Petals present, 2·5–3 mm. long ; leaves up to about 6 cm. long, leaflets rounded at apex ; fruits 1·2–2·5 cm. long, on pedicels up to about 5 mm. long, not congested at the apex of the shoots .. .. 2. *hirsuta*

Petals absent, sepals 1·2–2·5 mm. long ; leaves similar to above ; fruits 1·5–3 cm. long, congested, subumbellate at the tips of the shoots .. .. 3. *trichocarpa*

1. **C. africana** *Linn.*—F.T.A. 1 : 60 ; Schulz in Engl. Bot. Jahrb. 32 : 414 (1902). A weak herb, 1–2 ft. high, with white flowers.

Br.Cam.: Cam. Mt., Esele Camp, 7,000 ft. (fr. Feb.) *Maitland* 1345 ! Cam. Mt., above Mimbia, 6,200 ft. (fl. & fr. Mar.) *Brenan* 9352 ! **F.Po:** 7,500 ft. *Mann* 1448 ! Musola to Moka (Jan.) *Guinea* 1581 ! Also in S. Tomé, the mountains of east and central tropical Africa, S. Africa, Madagascar, India and Brazil.

[Mann's specimen from Fernando Po has been identified as var. *arabica* (DC.) O. E. Schulz l.c. 416 (syn. *C. borbonica* Pers. var. *arabica* DC., syn. *C. africana* Linn. var. *pubescens* Hook. f., name only).]

2. **C. hirsuta** Linn.—F.T.A. 1 : 61 ; Schulz l.c. 464. Small annual, often much-branched or tufted at the base ; petals white.

Br.Cam.: Cam. Mt., 8,000–10,000 ft. (Nov.) *Mann* 2032 !. **F.Po:** 7,500–8,500 ft. *Mann* 1460 ! Common in temperate regions and on the mountains of tropical Africa.

3. **C. trichocarpa** *Hochst. ex A. Rich.*—F.T.A. 1 : 60 ; Schulz l.c. 462 ; Chev. Fl. Viv. 1 : 214. Weakly erect annual herb.

Br.Cam.: Buea, 3,000 ft. (fr. Jan., Apr., Nov.) *Migeod* 228 ! *Maitland* 216 ! *Brenan* 9586 ! Cam. Mt., Musake Camp, 5,600 ft. (Jan.) *Maitland* 1237 ! Bali, Bamenda (May) *Ujor* FHI 30397 !. Also in the mountains of tropical Africa and India.

6. **LEPIDIUM** Linn.—F.T.A. 1 : 68.

An erect glabrous annual ; leaves variable, often deeply pinnatisect, with linear segments ; flowers shortly racemose, white, small ; fruits compressed, broadly elliptic, emarginate, slightly winged towards the top, 5–6 mm. long, about 4 mm. broad ; seeds ellipsoid, smooth, 3 mm. long, brown or red .. .. *sativum*

L. sativum *Linn.*—F.T.A. 1 : 69 ; Chev. Fl. Viv. 1 : 197. The Common Cress. Commonly cultivated in regions away from the coast ; naturalized in some places.

Fr.Sud.: Goundam *Vuillet* in *Hb. Chev.* 25971. **Fr.G.:** Siguiri *Chev.* 301. **Fr.Nig.:** Agades *Chev.* 43474. **N.Nig.:** Kano (Feb.) *Dalz.* 333 ! Baradau, Bauchi Plateau (fr. May) *Lely* 87 ! Abinsi (fr. Feb.) *Dalz.* 791 ! (See Appendix, p. 24.)

7. **SCHOUWIA** DC.—F.T.A. 1 : 67.

A woody glabrous herb, branching from the base ; cauline leaves sessile, amplexicaul, oblong-lanceolate, deeply cordate-auriculate at base, acute, 4–8 cm. long, 2–4 cm. broad, papery, distinctly nervose ; flowers racemose ; sepals oblong, about 1 cm. long, with narrowly membranous margins ; petals slightly longer, purplish ; fruit compressed, winged, broadly elliptic, 2·5 cm. long, tipped by the persistent acute style about 0·5 cm. long .. .. *schimperi*

S. schimperi *Jaub. & Spach* in Ann. Sci. Nat. Bot. 3, Sér. 13 : 366 (1849) ; Schulz in Engl. Pflanzenr. Crucif. 54, t. 16 (1923). *S. arabica* of F.T.A. 1 : 68 ; Chev. Bot. 24 ; F.W.T.A., ed. 1, 1 : 92 ; not of (Vahl) DC. *S. purpurea* of Chev. Fl. Viv. 1 : 200, not of (Forsk.) Schweinf. Robust annual to 3 ft. high, flowers purplish.

Fr.Sud.: Mossi (July) *Chev.* 24581 ! **Fr.Nig.:** several localities *fide* Chev. *l.c.* Also in Mauritania, central Sahara, eastern Sudan, Egypt, Abyssinia and Arabia.

20. VIOLACEAE

Herbs, shrubs, or small trees. Leaves alternate or rarely opposite, stipulate. Flowers actinomorphic or zygomorphic, from solitary to paniculate. Sepals 5, imbricate. Petals 5, nearly equal or the lower larger and often clawed, imbricate. Stamens hypogynous, 5, alternate with the petals ; anthers 2-celled, opening lengthwise, with the connective produced beyond the cells. Ovary superior, sessile, 1-celled, with usually 3 parietal placentas each with one or more ovules ; style usually simple. Fruit an elastic loculicidal capsule, one- or more-seeded. Seeds with fleshy endosperm and central mostly straight embryo.

A widely spread family, the woody members mostly in the tropics, the herbaceous at higher altitudes and in temperate regions. Recognized by the often zygomorphic flowers, definite stamens with produced connective, and parietal placentation.

Trees or shrubs ; flowers more or less actinomorphic, with subequal petals, or if zygomorphic then lower petal not saccate or spurred at the base :

Petals subequal; fruit a 3-valved capsule :

Flowers borne on older branches or main stem ; seeds arillate, endosperm sparse ; staminal appendages cohering with each other .. .. 1. **Allexis**

Flowers terminal or axillary on leafy shoots ; seeds not arillate, endosperm copious ; stamens free, or connate below the anthers, staminal appendages quite free 2. **Rinorea**

Petals unequal, the lower petal hooded at the apex and covering the other broader petals in bud ; ovary opening very early, seeds developing in the open, placentas becoming woody and bearing dense clusters of large drupe-like seeds 3. **Gymnorinorea**

Herbaceous or suffrutescent ; flowers zygomorphic, with lower petal saccate, gibbous or spurred at base :

Lower petal conspicuously larger than the rest and clawed, saccate or gibbous at the base ; sepals not produced below the base ; seeds often longitudinally striate ; stipules entire .. .. 4. **Hybanthus**

Lower petal not clawed at the base, spurred or saccate ; sepals produced below the base ; seeds smooth ; stipules foliaceous, divided .. .. .. 5. **Viola**

1. ALLEXIS Pierre in Bull. Soc. Linn. Paris 1 : 25 (1898).

Small tree, to 7 m. high ; leaves oblong, 14–30 cm. long, 4·5–10 cm. broad, acuminate, narrowed at base into winged petiole 2–4 cm. long, 9–15 pairs of lateral nerves ; petals entirely reflexed and overlapping the sepals, 5 mm. long ; pedicels 5–10 mm. long .. .. *obanensis*

A. obanensis (*Bak. f.*) *Melchior* in Notizbl. Bot. Gart. Berl. 8 : 655 (1924). *Alsodeia obanensis* Bak. f. in Cat. Talb. 6 (1913). *Rinorea obanensis* (Bak. f.) De Wild. in Bull. Jard. Bot. Brux. 6 : 179 (1920) ; F.W.T.A., ed. 1, 1 : 95. Petals cream, anthers bright yellow ; flowers on old branches.
S.Nig.: Oban *Talbot* 606 !

2. RINOREA Aubl. Pl. Gui. 1 : 235 (1775). *Alsodeia* Thouars—F.T.A. 1 : 106.

Leaves spinose-dentate, coriaceous, oblong-ovate to lanceolate, long-acuminate, 12–22 cm. long, 3–9 cm. broad ; flowers 3–4 mm. diam. on very short pedicels, sepals ribbed .. .. 1. *ilicifolia*

Leaf margin not spiny :

Petals entirely reflexed and overlapping the sepals :

Ovary pilose ; flowers numerous in 5–11 cm. long racemes, pedicels 8–15 mm. long ; inflorescence densely short-pilose ; leaves oblong, up to 12 cm. long and 3–5 cm. broad, crenulate .. .. 2. *gracilipes*

Ovary glabrous ; flowers several in racemes up to 5 cm. long, pedicels 8–12 mm. long ; inflorescence pilose ; leaves ovate-elliptic to lanceolate, up to 8 cm. long and 1·5–3 cm. broad, crenulate .. .. 3. *ardisiiflora*

Petals not reflexed, or only at the tip :

Leaves auriculate to subauriculate at base :

Lamina up to 15 cm. long :

Margin of leaf obtusely serrate in upper part only, main lateral nerves 12–16 on each side ; bush to 0·5 m. high .. .. 4. *bussei*

Margin of leaf denticulate from base to apex, main lateral nerves 9–12 on each side ; tree to 7 m. high .. .. 5. *kibbiensis*

Lamina 15–40 cm. long, oblanceolate :

Stems, midribs, lateral nerves beneath and inflorescence axis densely pubescent ; sepals lanceolate, 5–8 mm. long .. .. 6. *longisepala*

Stems, midribs, lateral nerves beneath and inflorescence axis glabrous or sparsely pubescent ; sepals oblong-ovate, 2–4 mm. long :

Leaves glandular beneath, markedly auricled and amplexicaul at base ; peduncles up to 3 cm. long ; sepals about 4 mm. and petals about 6 mm. long 7. *ledermannii*

Leaves not glandular beneath, subauriculate, with definite petiole 7–10 mm. long ; peduncles 4–7 cm. long ; sepals about 2 mm. and petals about 4 mm. long 8. *oblanceolata*

Leaves obtuse, acute or cuneate at base :

*Sepals markedly ribbed fanwise :

Petioles up to 7 mm. long ; inflorescences axillary along the shoots, slender, up to 7 cm. long, pubescent ; branchlets and leaves sparsely pubescent ; leaves obovate to broadly elliptic, 6–13 cm. long, 2·5–6 cm. broad ; sepals broadly ovate, 1 mm. long ; petals 6–7 mm. long, 2–2·5 mm. broad ; ovary glabrous (see fig. 31, 3) .. .. 9. *convallariiflora*

Petioles more than 7 mm. long ; inflorescences at ends of shoots, mainly terminal with subsidiary axillary branches :

†Filaments short but distinct, about 0·5 mm. long :

Sepals 1·5 mm. long and broad ; petals 5 mm. long and 1 mm. broad ; appendage of anther ovate, emarginate ; pedicels 2–3 mm. long ; petioles 1–2 cm. long, lamina lanceolate, 10–15 cm. long, 2·5–5 cm. broad .. .. .. 10. *afzelii*

Sepals 2·5–3 mm. long, 2·5–3·5 mm. broad ; petals 5–6 mm. long and 3 mm. broad, appendage of anther suborbicular not emarginate ; pedicels 5–7 mm. long ; petioles 0·8–2·2 cm. long, lamina elliptic, 13–20 cm. long and 6–11·5 cm. broad (see fig. 31, 4) .. .. 11. *keayi*

†Anthers sessile :

Lamina 15–20 cm. long, 4–8 cm. broad ; staminal appendage rounded at apex, connective produced into a spoon-shaped process not ¼ length of anther 12. *prasina*

Lamina 15–27 cm. long, 6–10 cm. broad ; staminal appendage subacute at apex, connective produced into a filamentous process half the length of the anther 13. *crassifolia*

*Sepals not markedly ribbed, or only midrib prominent :

Leaves glandular beneath :

Ovary puberulous or pilose ; inflorescence mainly terminal with occasional subsidiary branches :

Ovary puberulous ; petioles generally not exceeding 1 cm. long ; lamina oblong, narrowing into the acumen :

Extremities and rhachis glabrous ; sepals 6 mm. long, 4 mm. broad ; staminal tube free at the margin, lobed behind the anthers, appendage produced beyond the anthers and slightly emarginate at the tip .. 14. *johnstonii*

Extremities and rhachis pubescent ; sepals 4 mm. long, 2 mm. broad ; staminal tube not free, appendage produced beyond the anthers and bifid 15. *talbotii*

Ovary densely pilose ; petioles generally exceeding 1 cm. long :

Branchlets, midrib and nerves beneath and inflorescence long-hirsute :

Anthers sessile, pubescent ; sepals 2 mm. long, 1·5 mm. broad ; staminal tube free at the margin with long narrow lobes behind the anthers, connective produced into a spoon-shaped process ; lamina obovate to oblanceolate, markedly acuminate, cuneate and serrate, 8–18 cm. long, 3–6 cm. broad (see fig. 31, 1).. .. .. 16. *elliotii*

Anthers not sessile, filaments distinct, anthers glabrous or glabrescent ; otherwise similar to *elliotii* .. .. 17. *djalonensis*

Branchlets, midrib and nerves beneath more or less glabrous, not bristly pilose ; inflorescence densely but rather shortly hirsute :

Connective not produced beyond the anthers which are crowned with a tuft of hairs ; petiole 3–8 cm. long ; lamina elliptic-oblanceolate, abruptly long-acuminate, 12–25 cm. long, 4–8 cm. broad ; sepals rounded about 1·5 mm. diam. ; inflorescence to 20 cm. long .. .. .. 18. *longicuspis*

Connective produced, bifid ; petiole rather short ; lamina oblanceolate to narrowly obovate, cuneate at base, gradually acuminate, 8–12 cm. long, 3–5 cm. broad ; sepals ovate, about 2 mm. long ; inflorescence 4–7 cm. long 19. *arenicola*

Ovary glabrous ; inflorescences all or mostly in axils of full-sized leaves, sometimes with a terminal inflorescence in addition :

Sepals glabrous except for ciliate margin, ovate to rotundate, 2 mm. diam. ; inflorescences 4–5 cm. long, glabrous ; petiole 2–4 cm. long ; lamina elliptic to lanceolate, 15–22 cm. long, 6–8 cm. broad .. .. 20. *parviflora*

Sepals puberulous, oblong to broadly lanceolate, 3–4 mm. long ; inflorescences 3–12 cm. long, puberulous ; petiole 2–10 cm. long ; lamina oblong, 20–30 cm. long, 8–14 cm. broad .. .. 21. *kamerunensis*

Leaves not glandular beneath :

Inflorescences axillary ; petioles up to 7 mm. long ; inflorescences pubescent, up to 1 cm. long ; flowers about 3 mm. long, congested, bracts persistent ; stamens free ; branchlets densely pubescent ; leaves elliptic, obtuse at base, acuminate, 5–10 cm. long, 2·5–5 cm. broad ; stipules linear elongated ; ovary minutely tuberculate .. .. 22. *breviracemosa*

Inflorescences terminal, sometimes with subsidiary axillary branches, to several cm. long ; petioles usually well over 7 mm. long :

**Ovary pilose, pubescent or puberulous :

Ovary densely pilose :

Staminal tube 1·5–2 mm. long ; petals 5 mm. long, sepals setose ; pedicel 2 mm. long ; inflorescence up to 10 cm. long, spiciform ; petiole 2–3 cm. long, lamina elliptic-lanceolate, 15–18 cm. long, about 6 cm. broad, glabrous 23. *pilosa*

Staminal tube 0·75 mm. long ; petals 4 mm. long, sepals pilose ; pedicel 1 mm. long ; inflorescence up to 20 cm. long, paniculate ; petiole 2·5–5 cm. long, thickened at each end, lamina oblong-oblanceolate, 16–20 cm. long, 5–7·5 cm. broad, sparsely pubescent, irregularly reddish-tinted beneath 24. *rubrotincta*

Ovary sparsely pilose, pubescent or puberulous :

††Ovary pubescent at first, becoming furfuraceous, fruit furfuraceous :

Sepals 3–4 mm., petals 5–6 mm. long ; staminal tube 3·5 mm. long ; inflorescence 4–22 cm. long, generally laxly paniculate, densely puberulous ; petiole 1–4 (rarely to 7) cm. long ; lamina elliptic, oblong, or oblanceolate, entire to dentate, 12–30 cm. long, 4–13 cm. broad, midrib sparsely puberulous to glabrous .. .. 25. *oblongifolia*

Sepals 2 mm., petals 3–4 mm. long ; staminal tube 1·5 mm. long ; inflorescence a narrow panicle 3–7 cm. long, pubescent, usually hirsute at base ; petiole 0·7–1·5 cm. long ; lamina obovate-elliptic to oblanceolate, markedly dentate, 8–26 cm. long, 2·5–9 cm. broad ; pubescent on midrib and nerves 26. *dentata*

††Ovary and fruit not furfuraceous :

Sepals densely hirsute, 3 mm. long ; petals 5–6 mm. long, reflexed at tip ; staminal tube 0·75 mm. long ; inflorescence spiciform, to 10 cm. long, hirsute ; petiole 1–6 cm. long ; lamina obovate to oblong, 10–20 cm. long, 4–10 cm. broad, midrib and nerves sparsely pubescent to glabrous 27. *brachypetala*

Sepals puberulous or glabrous :

Sepals 1·5–2 mm., petals 3–4 mm. long ; staminal tube with free margin, ovary sparsely pilose ; inflorescence 3–6·5 cm. long ; petiole 1–4 cm. ; lamina oblanceolate, 7–17 (rarely to 25) cm. long, 2·5–6 cm. broad, with 6–8 pairs of lateral nerves ; branchlets sparingly pilose 28. *aylmeri*

Sepals 3 mm., petals 5 mm. long ; staminal tube without free margin, ovary minutely puberulous ; inflorescence 4–12 cm. long ; petiole 1–4 (rarely to 7) cm. long, lamina elliptic to oblong 20–30 cm. long, 6–10 cm. broad, with 12–14 pairs of lateral nerves ; branchlets glabrous 29. *adnata*

**Ovary glabrous :

Sepals 1–1·5 mm., petals 3 mm. long ; inflorescence spiciform, 1·5–6 cm. long ; petiole 1–4 cm. ; lamina obovate-elliptic to narrowly elliptic, 5–19 cm. long, 2–8 cm. broad, subdentate, glabrous (see Fig. 31, 2) 30. *subintegrifolia*

Sepals 2–3 mm., petals 4–6 mm. long :

Sepals densely hirsute, petals reflexed at tip :

Petals 5–6 mm. long ; petiole 1–6 cm. long, usually more than 2 cm. ; shrub to 1·5 m. high ; for other characters see above .. .. 27. *brachypetala*

Petals 4 mm. long ; inflorescence 4–8 cm. long ; petiole 1–2 cm. long ; lamina obovate-elliptic to obovate-oblanceolate, 7–13 cm. long, 3·5–6 cm. broad, glabrous ; tree to 6 m. high .. .. 31. *poggei*

Sepals not densely hirsute, mostly puberulous :

Petiole 3·5–8 cm. long ; lamina oblong, 22–28 cm. long, 9–10 cm. broad, lateral nerves 10–11 pairs, glabrous ; sepals 2 mm., petals 5 mm. long ; inflorescences about 15 cm. long with several axillary as well as terminal panicles .. .. 32. *preussii*

Petiole 0·7–2·5 cm. long ; lamina up to 18 cm. long and 8 cm. broad :

Inflorescence densely pubescent, spiciform, to 4 cm. long ; anthers sessile, staminal tube very short ; petiole 1–2 cm. ; lamina elliptic, 5–10 cm. long, 3·5–5 cm. broad .. .. 33. *whytei*

Inflorescence sparsely puberulous to glabrous ; filaments distinct, staminal tube 1·5 mm. long :

Staminal appendage lanceolate ; petals not ciliate or very sparsely so, 6 mm. long ; inflorescence 2·5–5 cm. long on a peduncle about 2 cm. long ; petiole 1–2 cm. long ; lamina narrowly oblong, 8–18 cm. long, 1·5–6 cm. broad, glabrous ; branchlets glabrous, petiole pubescent 34. *liberica*

Staminal appendage short, rounded ; petals densely ciliate, about 4 mm. long ; inflorescence 3·5–8 cm. broad, rather widely paniculate ; petiole 0·7–2·5 cm. long ; lamina broadly elliptic to obovate, 9–18 cm. long, 2·5–8 cm. broad, pilose on midrib ; branchlets and petiole pilose 35. *microdon*

1. **R. ilicifolia** (*Welw. ex Oliv.*) *O. Ktze.* Rev. Gen. Pl. 1 : 42 (1891) ; De Wild. in Bull. Jard. Bot. Brux. 6 : 166 ; Chev. Fl. Viv. 1 : 231. *Alsodeia ilicifolia* Welw. ex Oliv.—F.T.A. 1 : 108. Glabrous shrub or small tree, up to 15 ft. ; flowers cream.
Fr.G.: Kouria (Nov.) *Chev.* 14820 ! **S.L.:** Sasseni, Scarcies R. (Jan.) *Sc. Elliot* 4427 ! Ninia, Talla Hills (Feb.) *Sc. Elliot* 4868 ! Kenema (Nov.) *Deighton* 407 ! Bumbuna (Jan.) *Deighton* 3594 ! **Iv.C.:** *Aubrév.* 1801 ! Bouroukrou (Dec.) *Chev.* 16641 ! 16741 ! **G.C.:** W. Afao Hills F.R. (Feb.) *Darko* 761 ! Juaso (Feb.) *Akpabla* 273 ! **S.Nig.:** Olokemeji (Jan.) *Keay* FHI 22470 ! Okomu F.R., Benin (Dec.) *Brenan* 8491 ! 8513 ! Eket *Talbot* ! Widespread in east tropical Africa and in Angola.

2. **R. gracilipes** *Engl.* Bot. Jahrb. 33 : 136 (1902) ; Exell & Mendonça Consp. Fl. Ang. 1 : 75. Shrub or small tree, flowers white.
Br.Cam.: Missellele, Tiko (Jan.) *Box* 3563 ! Also in French Cameroons, Gabon, Congo and Angola.

3. **R. ardisiiflora** (*Welw. ex Oliv.*) *O. Ktze.* l.c. 42 (1891) ; Exell & Mendonça l.c. 74. *Alsodeia ardisiiflora* Welw. ex Oliv. F.T.A. 1 : 108. *R. feliciana* A. Chev. Fl. Viv. 1 : 229 (1938), French descr. only. Small tree, flowers white.

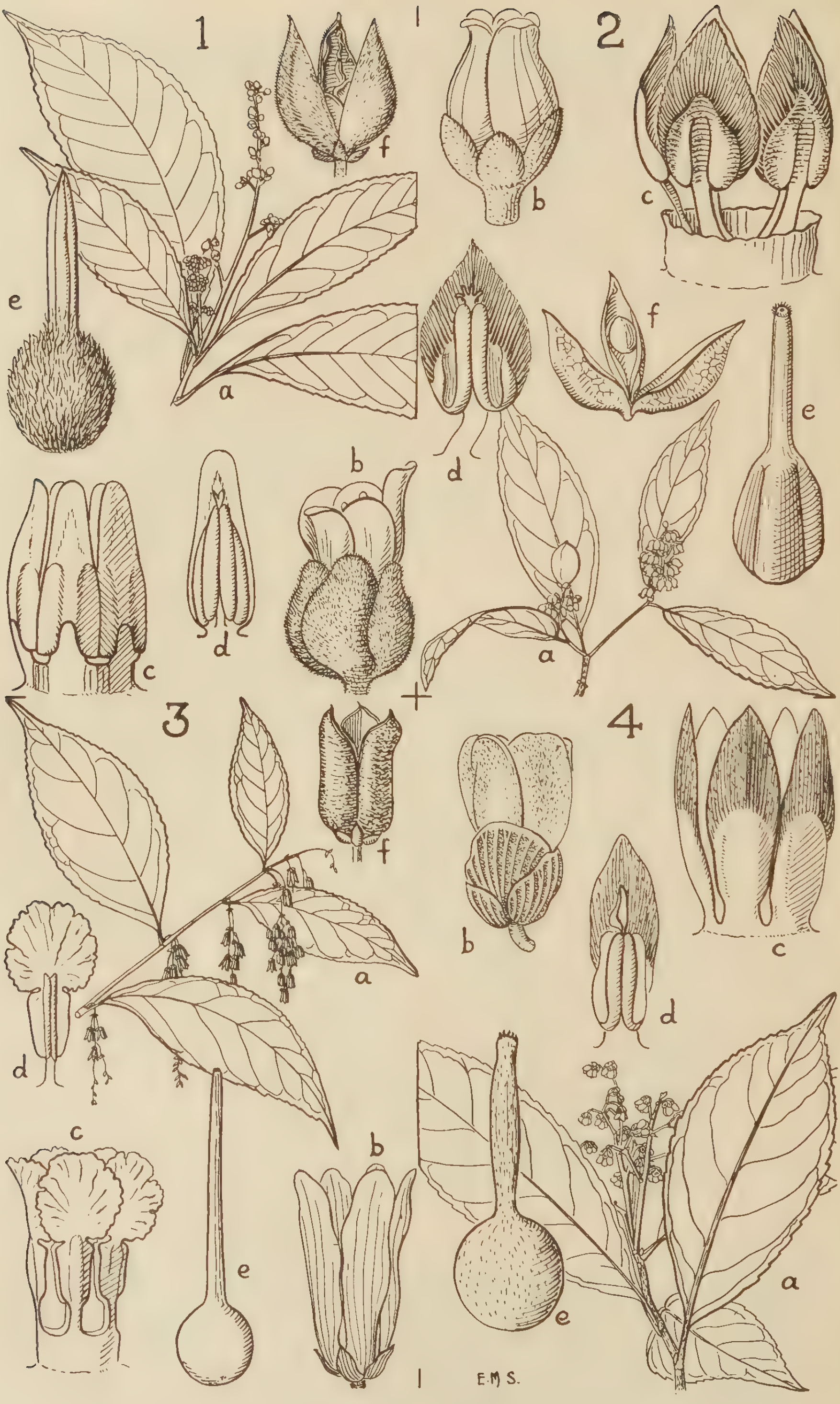
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FIG. 31.—RINOREA SPP. (VIOLACEAE).

Fr.G.: Kindia (Apr.) *Jac.-Fel.* 72! **G.C.:** Ateiku (Nov.) *Vigne* 4749! Also in French Cameroons, Gabon, Congo and Angola.

4. **R. bussei** *M. Brandt* in Engl. Bot. Jahrb. 51: 125 (1913); De Wild. l.c. 155. A bush 1½ ft. high, with yellowish flowers.
Togo: Kpeta, 1,950 ft., in shady places (Nov.) *Busse* 3358.

5. **R. kibbiensis** *Chipp* in Kew Bull. 1923: 292; Chev. Fl. Viv. 1: 232. Shrubby tree, to 20 ft. high, with white flowers; common in understorey of forest.
Iv.C.: Mid. Comoé Valley (Dec.) *Chev.* 22567! 22572! Morenou (Nov.) *Chev.* 22440! 22454! **G.C.:** Kibbi Hills (Dec.) *Johnson* 507! Bibiani (Aug.) *Vigne* 1327! Kwahu Prasu (Feb.) *Vigne* 1615! **Br.Cam:** Mayoko (Feb.) *Dalz.* 8219! (See Appendix, p. 25.)

6. **R. longisepala** *Engl.* Bot. Jahrb. 33: 143 (1902); Brenan in Kew Bull. 1952: 443. Shrub, to 9 ft. high; sepals green, dull purplish towards the base.
S.Nig.: Oban *Talbot* 455! Kwa Falls, Calabar (Mar.) *Brenan* 9229! Also in French Cameroons and Spanish Guinea.

7. **R. ledermannii** *Engl.* Bot. Jahrb. 51: 121 (1913); Brenan l.c. Straggling much-branched shrub about 5 ft. high; flowers yellow.
Br.Cam.: S. Bakundu F.R. (Mar.) *Brenan* 9290! Also in French Cameroons.

8. **R. oblanceolata** *Chipp* l.c. 292 (1923); Chev. Fl. Viv. 1: 232. Shrub to 6 ft. high; flowers cream or greenish.
S.L.: Gorahun (Nov., Dec.) *Deighton* 378! 3803! Bandajuma (Nov.) *Deighton* 5267! **Lib.:** Begwai (Oct.) *Bunting* 21! Fayapulu (Oct.) *Linder* 1137! Bumbuma (Oct.) *Linder* 1322! **Iv.C.:** Lower Cavally, Grabo *Chev.* 19647; 19652.

9. **R. convallariiflora** *M. Brandt* in Engl. Bot. Jahrb. 51: 106 (1914). *R. euandra* Engl. ex Zenker in De Wild. l.c. 194, name only. Small tree 20 ft. high; flowers white.
G.C.: near Agogo, Ashanti (fl. & fr. Apr.) *Vigne* 1080! 1080*a*! *Irvine* 962! Amentia (Mar.) *Vigne* 1874! Birrim Dist. (Mar.) *Moor* 38! Also in French Cameroons.

10. **R. afzelii** *Engl.* Bot. Jahrb. 33: 138 (1902); De Wild. l.c. 150, partly. A shrub.
S.L.: *Afzelius.* Gola Forest (Dec.) *King* 128*b*!

11. **R. keayi** *Brenan* in Kew Bull. 1950: 336. Tree 20–25 ft. high; flowers cream.
S.Nig.: below Mt. Koloishe, Obudu, 4,000 ft. (Dec.) *Keay & Savory* FHI 25023! Ikwette—Balegette path, Obudu, 4,500 ft. (Dec.) *Keay & Savory* FHI 25206!

12. **R. prasina** (*Stapf*) *Chipp* in Kew Bull. 1923: 299. *Alsodeia prasina* Stapf in Johnston Lib. 577 (1906); M. Brandt in Engl. Bot. Jahrb. 50, Suppl. 412 as synonym of *R. afzelii* Engl. Glabrous shrub to 6 ft. high.
Gam.: near Bathurst (fr. Feb.) *Johnston* 91! **S.L.:** Njala (Oct., Feb.) *Deighton* 2544! 4704! York Pass (Dec.) *Deighton* 3336! Bumbuna (Jan.) *Deighton* 3595! **Lib.:** near Monrovia *Whyte*! Moylakwelli (Oct.) *Linder* 1315! **G.C.:** Abiabo, Axim (Nov.) *Vigne* 1424!

13. **R. crassifolia** (*Bak. f.*) *De Wild.* in Bull. Jard. Bot. Brux. 6: 158 (1920). *Alsodeia crassifolia* Bak. f. in Cat. Talb. 6 (1913). A shrub 8–9 ft.; petals dull yellow.
S.Nig.: Oban *Talbot* 1260!

14. **R. johnstonii** (*Stapf*) *M. Brandt* in Engl. Bot. Jahrb. 50, Suppl. 414 (1914); De Wild. l.c. 167; Chev. Fl. Viv. 1: 233. *Alsodeia johnstonii* Stapf in Johnston Lib. 577 (1906). A glabrous shrub with serrulate leaves; sepals dark, white-edged.
Lib.: Sinoe Basin *Whyte*! Grand Bassa *Dinklage* 1944! **Iv.C.:** Lower Cavally *Chev.* 19803; 19832.

15. **R. talbotii** (*Bak. f.*) *De Wild.* l.c. 188 (1920). *Alsodeia talbotii* Bak. f. in Cat. Talb. 7 (1913). Shrub to 6 ft. high.
S.Nig.: Oban *Talbot* 478! Also in Gabon.

16. **R. elliotii** *Engl.* Bot. Jahrb. 33: 144 (1902); De Wild. l.c. 161; Chev. Fl. Viv. 1: 233. *R. punctata* Chipp in Kew Bull. 1923: 293; F.W.T.A., ed. 1, 1: 95. Small tree 4–30 ft. high; flowers yellow; locally abundant in forest undergrowth.
S.L.: Kofiu Mt. (Jan.) *Sc. Elliot* 4605! Kambui (Mar.) *Lane-Poole* 201! **Lib.:** *Dinklage* 3329! Moylakwelli (Oct.) *Linder* 1316! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Anwhiaso F.R. (Nov.) *Vigne* 189! R. Asenango F.R. (Feb.) *Andoh* FH 4304! **S.Nig.:** Okomu F.R. (Jan., Feb.) *Brenan* 8840! 8903! 9088! Sapoba (Mar.) *Jones* FHI 7448! *Kennedy* 411! 2193! Eket *Talbot*! Also in Gabon.

17. **R. djalonensis** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1: 95 (1927); Kew Bull. 1928: 26; Chev. Bot. 34, name only; Chev. Fl. Viv. 1: 234. Shrub or small tree.
Fr.G.: Dalaba-Diaguissa Plateau (Oct.) *Chev.* 18741. And several other localities *fide* Chev. *l.c.*

18. **R. longicuspis** *Engl.* Bot. Jahrb. 33: 137 (1902); De Wild. l.c. 172. *R. elliotii* of Chev. Fl. Viv. 1: 233, partly. Small tree to 24 ft. high, with yellow flowers.
Lib.: Boporo (Nov.) *Baldwin* 10387! **Iv.C.:** Banco *Martineau* 244! Abidjan *Aubrév.* 71! 174! 312! **G.C.:** Begoro (young fr. Mar.) *Johnson* 695! Obuasi (Feb.) *Rea* 1623! Also in French Cameroons.

19. **R. arenicola** *M. Brandt* in Engl. Bot. Jahrb. 51: 111 (1913); De Wild. l.c. 150. A bush or small tree, with yellow flowers.
Lib.: Grand Bassa, among bushes towards the sea front (fl. and young fr. Oct.) *Dinklage* 1854.

20. **R. parviflora** *Chipp* in Kew Bull. 1923: 295. A glabrous shrub with almost entire leaves.
S.Nig.: Oban *Talbot* 1391! Also in Gabon.

21. **R. kamerunensis** *Engl.* Bot. Jahrb. 33: 139 (1902); De Wild. l.c. 167; Brenan in Kew Bull. 1952: 442. Erect single-stemmed shrub, to 4 ft. high; flowers nodding, sepals yellowish, petals white.
Br.Cam.: between Victoria and Bimbia (Apr.) *Preuss* 1221! Near Barombi (Apr.) *Preuss* 143. S. Bakundu F.R. (Mar.) *Brenan* 9289! 9289*a*! 9289*b*! Also in French Cameroons.

22. **R. breviracemosa** *Chipp* in Kew Bull. 1923: 293. *Alsodeia latifolia* ? Thouars—F.T.A. 1: 107. Small tree, to 9 ft. high, in marsh forest; flowers white.
S.L.: (May) *Barter*! *Aylmer* 38! York Pass (fr. June) *Sierra Leone Herb. No.* 53! **Lib.:** Peahtah *Linder* 1045! **S.Nig.:** Omo F.R. (Mar.) *Jones & Onochie* FHI 17221! Oban *Talbot* 477!

23. **R. pilosa** *Chipp* l.c. 294 (1923). A shrub.
S.Nig.: Oban *Talbot*!

FIG. 31.—RINOREA SPP. (VIOLACEAE).

1. *R. elliotii* Engl.—a, flowering shoot, × ⅓; b, flower, × 6; c, stamens from without, × 10; d, stamen from within, × 10; e, ovary and style, × 15; f, fruit, × 1½.
Drawn from *Brenan* 8903 & 9088.
2. *R. subintegrifolia* (P. Beauv.) O. Ktze.—a, flowering shoot, × ⅓; b, flower, × 6; c, stamens, × 20; d, stamen from within, × 20; e, ovary and style, × 15; f, fruit, × 1½.
Drawn from *Brenan* 8492 & 8848.
3. *R. convallariiflora* M. Brandt—a, flowering shoot, × ⅓; b, flower, × 4; c, stamens, × 12; d, stamen from within, × 12; e, ovary and style, × 12; f, fruit, × 1½.
Drawn from *Vigne* 1080*a*.
4. *R. keayi* Brenan—a, flowering shoot, × ⅓; b, flower, × 4; c, stamens, × 10; d, stamen from within, × 10; e, ovary and style, × 10.
Drawn from *Keay & Savory* FHI 25206.

24. **R. rubrotincta** *Chipp* l.c. 294 (1923) ; Chev. Fl. Viv. 1 : 236. Shrub, or small tree to 30 ft. high.
Lib.: Begwai (Oct.) *Bunting* 155! **Iv.C.:** (May) *Aubrév.* 2112! Soumie (July) *Aubrév.* 453! Widespread *fide* Chev. *l.c.*

25. **R. oblongifolia** (*C. H. Wright*) *Marquand ex Chipp* l.c. 296 (1923) ; Chev. Fl. Viv. 1 : 240, partly. *Pittosporum oblongifolium* C. H. Wright in Kew Bull. 1897 : 243. *Alsodeia welwitschii* Oliv. F.T.A. 1 : 110, partly. *R. dichroa* Mildbr. & Melchior in Notizbl. Bot. Gart. Berl. 10 : 974, name only. Tree, to 35 ft. high ; petals yellowish.
S.L.: Kambia (Dec.) *Sc. Elliot* 4195! York Pass (Dec.) *Lane-Poole*! Bobobo near Giswahun (Dec.) *Deighton* 3811! Near Kongohun (fr. Apr.) *Deighton* 3679! Jau (Oct.) *Deighton* 5214! **Lib.:** Ganta *Harley*! **Iv.C.:** Agboville (Nov.) *Chev.* 22380! **G.C.:** Larte (Oct.) *Johnson* 805! Ewisa, Saltpond Dist. (Aug.) *Chipp* 566! Bana Hill, Krobo (Jan.) *Irvine* 1923! Subiri F.R. (Feb.) *Foggie* 4939! **S.Nig.:** Old Calabar *Thomson* 100! Kwa Falls (Mar.) *Brenan* 9231! Iso Bendiga (Dec.) *Keay* FHI 28267! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 737! Likomba (Dec.) *Mildbr.* 10765! Also in French Cameroons, Gabon and Uganda and A.-E. Sudan. (See Appendix, p. 25.)

26. **R. dentata** (*P. Beauv.*) *O. Ktze.* Rev. Gen. Pl. 1 : 42 (1891) ; De Wild. l.c. 159 ; Chev. Fl. Viv. 1 : 239. *Ceranthera dentata* P. Beauv. Fl. Oware 2 : 11 (1808). *Alsodeia dentata* (P. Beauv.) Oliv. F.T.A. 1 : 110. *R. bipindensis* Engl. Bot. Jahrb. 33 : 145. Shrub, or small tree to 25 ft. high ; petals yellow.
Lib.: Grand Bassa (Feb.) *Dinklage* 1785! **G.C.:** Axim (Dec.) *Johnson* 887! **S.Nig.:** Lagos *Rowland*! *Lamborn* 363! Ikirun (Feb.) *Millson*! Idanre (Jan.) *Brenan* 8728! Okomu F.R. (fl. & fr. Jan.) *Brenan & Jones* 8911! 8912! Eket *Talbot* 3132! **Br.Cam.:** Victoria (Mar.) *Maitland* 519! Likomba (Nov.) *Mildbr.* 10733! **F.Po:** (Dec.) *Mann* 90! Ureka (Feb.) *Guinea* 2539! Also in Principe and French Cameroons, and extending to Angola and Uganda. (See Appendix, p. 25.) [Arborescent specimens from the Cameroons, with congested inflorescences may prove to be a distinct variety or species.—R.W.J.K.]

27. **R. brachypetala** (*Turcz.*) *O. Ktze.* l.c. 42 (1891), partly ; De Wild. l.c. 153 ; Chev. Fl. Viv. 1 : 238. *Alsodeia brachypetala* Turcz.—F.T.A. 1 : 109, partly. Shrub to 5 ft. high.
S.L.: Yonibana (Oct., Nov.) *Thomas* 4017! 4229! 5164! 5187! **Lib.:** *Cook* 58 ; 272 ; 331. **G.C.:** Subuma F.R. (Nov.) *Cansdale* 3975! Abetifi Kwahu (Jan.) *Irvine* 1689! **S.Nig.:** Lagos *Moloney*! Ilaro (Jan.) *Millen* 100! Shasha F.R. (Feb., Mar.) *Richards* 3065! 3097! 3171! Okomu F.R. (fl. & fr. Dec.–Feb.) *Brenan* 8500! 8855! 8855*a*! 8855*b*! Also in French Cameroons, Congo and Angola.

28. **R. aylmeri** *Chipp* in Kew Bull. 1923 : 294 ; Chev. Fl. Viv. 1 : 235. Shrub, to 5 ft. high, in deep shade, near water ; tree 12–15 ft. (*fide* Linder).
S.L.: Pujehun (Apr.) *Aylmer* 63! Yonibana (Oct., Nov.) *Thomas* 5159! 5166! 5279! Kenema (Nov.) *Deighton* 406! Njala (Oct., Nov.) *Deighton* 2408! 2538! **Lib.:** Gbanga (Sept.) *Linder* 606! Ganta *Harley*! **Iv.C.:** Mt. Nienokoue *Chev.* 19477.

29. **R. adnata** *Chipp* l.c. 295 ; Brenan in Kew Bull. 1952 : 442. Shrub, to 7 ft. high, little-branched ; flowers pale yellow.
Br.Cam.: S. Bakundu F.R. (Mar.) *Brenan* 9260! Also in French Cameroons.

30. **R. subintegrifolia** (*P. Beauv.*) *O. Ktze.* l.c. 42 (1891) ; De Wild. l.c. 187 ; Chev. Fl. Viv. 1 : 239. *Ceranthera subintegrifolia* P. Beauv. Fl. Oware 2 : 11 (1808). *Alsodeia subintegrifolia* (P. Beauv.) Oliv. F.T.A. 1 : 109. *R. viridis* Burtt Davy, name only. Shrub, to 7 ft. high ; flowers greenish-white or cream-yellow.
Fr.G.: Rio Nunez *Heudelot* 694! Kouria *Chev.* 14745! Bambaya (Feb.) *Chev.* 20674! **S.L.:** Regent (Dec.) *Sc. Elliot* 4159! Kambia (Dec.) *Sc. Elliot* 4385 (partly)! Mabonto (Oct.) *Thomas* 3492! Kenema (Nov.) *Deighton* 405! Njala (Oct., Jan.) *Deighton* 2537! *Dalz.* 8137! Ro-yak, Scarcies (Jan.) *Deighton* 4038! **Lib.:** Monrovia *Whyte*! Ganta *Harley*! Sodu (Jan.) *Bequaert* 51! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Opon Mansi F.R. (Oct.) *Darko* 53! Abiabo Axim (Nov.) *Vigne* 1425! **N.Nig.:** Abinsi *Dalz.* 975! **S.Nig.:** Lagos *Lamborn* 366! Okomu F.R. (fl. & fr. Dec.–Jan.) *Brenan* 8492! 8848! Sapoba (Nov.) *Keay* FHI 25617–9! Eket *Talbot* 3373! Calabar *Thomson* 30! **Br.Cam.:** Victoria (Nov.) *Maitland* 785! Rio del Rey *Johnston*! S. Bakundu F.R. (Jan.) *Keay* FHI 28565! Also in French Cameroons.

31. **R. poggei** *Engl.* Bot. Jahrb. 33 : 142 (1902) ; De Wild. l.c. 181. Tree, to 20 ft. high ; flowers cream-yellow.
N.Nig.: Dogon Kurmi, Plateau Prov. (Nov.) *Keay* FHI 21039! **S.Nig.:** Oshogbo *Millson* 140! Omo F.R. (Mar.) *Jones* FHI 16623! Akure F.R. (Oct.) *Keay* FHI 25483! Also in Cameroons, Congo, Uganda and Kenya. (See Appendix, p. 25.)

32. **R. preussii** *Engl.* l.c. 140 (1902) ; De Wild. l.c. 182. Small tree.
S.Nig.: Udi *Kennedy* 3124! **Br.Cam.:** Victoria (Mar.) *Preuss* 1154!

33. **R. whytei** (*Stapf*) *M. Brandt* in Engl. Bot. Jahrb. 50, Suppl. 418 (1914). *Alsodeia whytei* Stapf l.c. 578. [Of the 3 specimens tentatively referred to this species in Chev. Bot. 35, one is cited as *R. elliotii* and two as *R. rubrotincta* in Chev. Fl. Viv. 1 : 234, 236.] A shrub.
Lib.: near Monrovia *Whyte*!

34. **R. liberica** *Engl.* l.c. 142 (1902) ; De Wild. l.c. 172. *Alsodeia liberica* (Engl.) Stapf l.c. 577. Shrub, with short terminal panicles of small yellowish-brown flowers.
Lib.: Grand Bassa, in forest near the coast (May) *Dinklage* 1931. Sinoe Basin *Whyte*!

35. **R. microdon** *M. Brandt* in Engl. Bot. Jahrb. 51 : 117 (1913) ; De Wild. l.c. 176. [*Heudelot* 724 and various other specimens have been referred to *R. oblongifolia* (C. H. Wright) Marquand ex Chipp by most authors, e.g. Chipp in Kew Bull. 1923 : 296 and F.W.T.A., ed. 1, 1 : 95 ; Chev. Fl. Viv. 1 : 18.] Shrub, to 5 ft. high, by river banks ; flowers greenish-white.
Fr.G.: *Farmar* 239! Rio Nunez *Heudelot* 724! **S.L.:** Yonibana (Nov.) *Thomas* 5105! 5111! 5185! Njala (Oct.–Mar.) *Deighton* 496! 1853! 2536! 4719! Lunsar (Mar.) *Jordan* 24! Kambia (Dec.) *Deighton* 840! Makene (Jan.) *Deighton* 3591! Mattru, Jong (June) *Deighton* 4771! **Lib.:** Webbo (Apr.) *Dinklage* 2661.

3. GYMNORINOREA Keay in Kew Bull. 1953 : 75.

Glabrous shrub ; leaves oblong to oblong-oblanceolate, cuneate to obtuse at base, acuminate, 11–23 cm. long, 3–8·5 cm. broad, 7–13 pairs of looping lateral nerves, obscurely crenate, petiole 3–6 mm. long ; flowers in axillary 2–3 cm. long cymes ; petals about 8 mm. long, the anterior petal hooded at the apex and covering the apices of the other broader petals ; capsule dehiscing when very young, so that the seeds develop in the open ; the 3 placentas becoming woody, 4–8 mm. long, each bearing 4–10 seeds ; mature seeds crowded, subsessile or with funicles up to 2 mm. long, obovoid-ellipsoid or subglobose, about 1 cm. long, drupe-like with leathery outer testa and hard inner testa .. .. *abidjanensis*

G. abidjanensis (*Aubrév. & Pellegr.*) *Keay* in Kew Bull. 1953 : 76, t. 3. *Rinorea abidjanensis* Aubrév. & Pellegr. in Bull. Soc. Bot. Fr. 92 : 256 (1946) ; Aubrév. Fl. For. C. Iv. 3 : 26, t. 253 (1936), French descr. only. Shrub or small tree to 8 ft. high, in dense forest ; flowers yellow, pinkish or reddish ; seeds yellow-green in dense clusters.
Lib.: Gbanga (Sept.) *Linder* 386! Dukwia R. (fr. Feb.) *Cooper* 157! Zwedru, Tchien (Aug.) *Baldwin* 7010! Beiden, Boporo (Nov.) *Baldwin* 10282! Greenville, Sinoe (fr. Mar.) *Baldwin* 11557! **Iv.C.:** Banco, Abidjan (Aug.) *Aubrév.* 1517! **G.C.:** Ankasa F.R. (Dec.) *Vigne* 3185! W. Afao Hills F.R. (Oct.) *Darko* 35! Afao F.R. *Akpabla* 898!

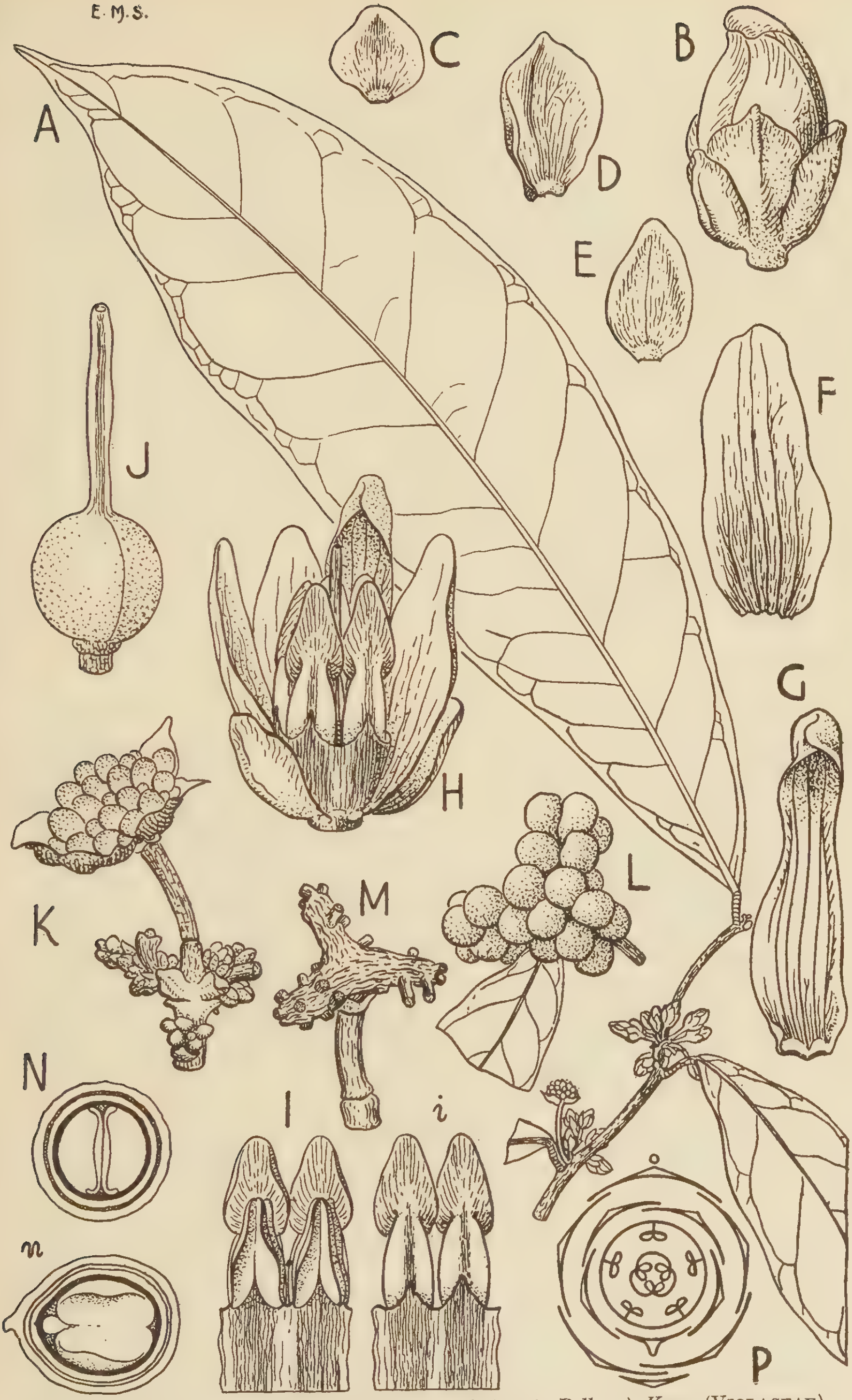

FIG. 32.—GYMNORINOREA ABIDJANENSIS (*Aubrév. & Pellegr.*) *Keay* (VIOLACEAE).

A, flowering shoot, × ⅔. B, flower, × 5. C, posterior sepal, × 5. D, lateral sepal, × 5. E, anterior sepal, × 5. F, lateral petal, × 5. G, anterior petal, × 5. H, flower with one sepal and petal removed, × 5. I & i, stamens, × 5. J, ovary with style, × 5. K, burst ovary, with exposed ovules, × 2. L, mature, naked seeds of one fruit, × ⅔. M, mature placentas with seeds removed, × 2. N & n, transverse and longitudinal section of seed, × 2. P, floral diagram.

A–E and K are drawn from *Linder* 386 ; F from *Baldwin* 10282 ; L from *Baldwin* 11557 ; M and N from *Cooper* 157.

4. HYBANTHUS Jacq.—F.T.A. 1 : 105, as *Ionidium* Vent.

Annual ; stems and branches acutely angled ; stipules linear, decurrent ; leaves sometimes fasciculate, crowded, linear, acute, 1-nerved, 2–5 cm. long, up to 3–4 mm. broad, very remotely denticulate or subentire, glabrous or nearly so ; pedicel about as long as the flower in bud ; sepals linear-lanceolate, sharply keeled, setose on the keel and margins .. .. 1. *thesiifolius*

Perennial, suffruticose ; stems slightly ribbed, glabrous or pubescent ; stipules linear, slightly decurrent ; leaves scattered, lanceolate or linear-lanceolate, acute, 4–7 cm. long, 0·5–1 cm. broad, remotely denticulate, with distinct lateral nerves ; pedicel longer than the flower, 1 cm. or more ; sepals not keeled, shortly setulose 2. *enneaspermus*

1. **H. thesiifolius** (*Juss. ex Poir.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 97 (1927) ; Kew Bull. 1928 : 26 ; Chev. Fl. Viv. 1 : 226. *Viola thesiifolia* Juss. ex Poir. in Lam. Encyl. 8 : 649 (1808). *Ionidium thesiifolium* (Juss. ex Poir.) DC., and var. *chenopodioides* Guill. & Perr. *I. enneaspermum* of F.T.A. 1 : 106, partly. *Viola guineensis* Schum. & Thonn. (1827). Erect, often much branched ; flowers lilac or bluish.
Sen.: (Dec.-Jan.) *Roger* 146 ! St. Louis *Heudelot* ! Walo *Heudelot* ! **Fr.Sud.:** Mossi, Ouagadougou (Aug.) *Chev.* 24714. Macina (Sept.) *Chev.* 24847. **G.C.:** Accra (Mar.–Oct.) *Brown* 409 ! *Deighton* 570 ! *Irvine* 544 ! 713 !

2. **H. enneaspermus** (*Linn.*) *F. v. Muell.* Fragm. 10 : 81 (1876) ; Chev. Fl. Viv. 1 : 227. *Viola enneasperma* Linn. (1753). *Ionidium enneaspermus* (Linn.) Vent.—F.T.A. 1 : 105. *I. dahomensis* and var. *maritimum* of Chev. Bot. 33, names only. *Viola lanceifolia* Schum. & Thonn. (1827). Erect, simple or often with numerous vertical branches from the base, up to 12–18 in. high ; flowers lilac or bluish.
Fr.G.: Pays de Guerzes (Mar.) *Chev.* 20941 ! **Lib.:** Nana Kru, Sinoe (Mar.) *Baldwin* 11586 ! Zeahtown, Tchien (Aug.) *Baldwin* 6951 ! **Iv.C.:** Baoulé (Aug.) *Chev.* 22256 ! Widespread *fide* Chev. *l.c.* **G.C.:** Accra (Aug.) *T. Vogel* ! Sekondi (Mar.) *Deighton* 621 ! Kumasi (Apr.) *Vigne* 1101 ! Atrokpe Krobo (Nov.) *Irvine* 1704 ! **Togo:** Kpedsu (Jan.) *Howes* 1080 ! Kpeve (Mar.) *Williams* 69 ! **Dah.:** various localities *fide* Chev. *l.c.* **N.Nig.:** Lokoja (July) *Dalz.* 575 ! Abinsi (July) *Dalz.* 729 ! Anara F.R., Zaria (July) *Keay* FHI 25953 ! **S.Nig.:** Lagos (Mar.) *Dawodu* 366 ! *Dalz.* 1041 ! 1235 ! Abeokuta *Barter* 3350 ! Onitsha *Barter* 1637 ! 1807 ! Oban *Talbot* 597 ! Kwa Falls (Mar.) *Brenan* 9236 ! **Br.Cam.:** Fang, Bamenda, 3,500 ft. (May) *Maitland* 1703 ! **F.Po:** Ureka (Feb.) *Guinea* 2498 ! Extends throughout tropical and S. Africa, Madagascar and also in tropical Asia and Australia.

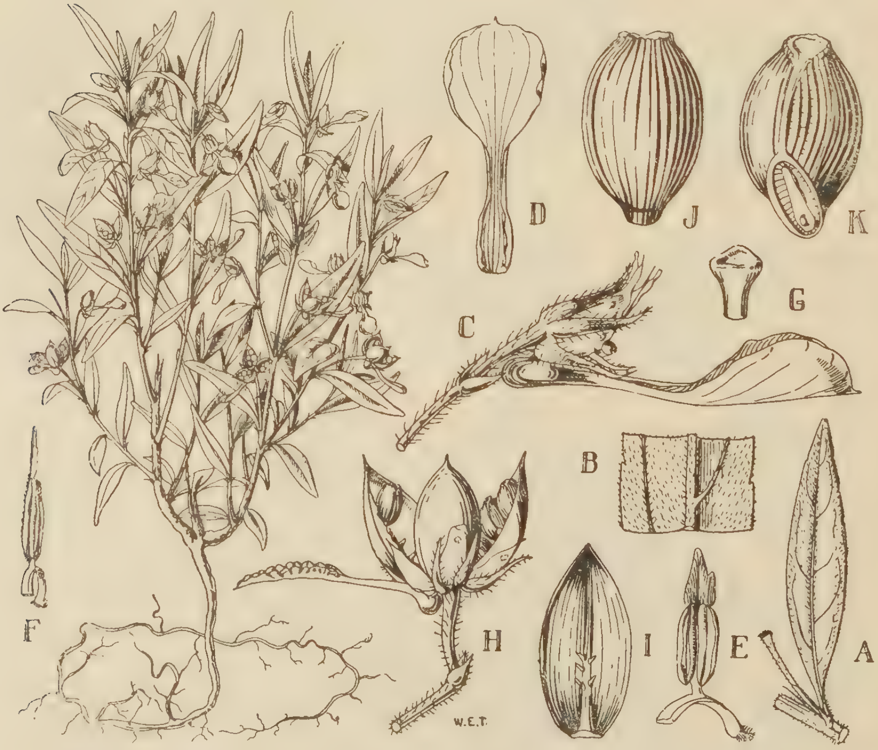

Fig. 33.—Hybanthus enneaspermus (*Linn.*) *F. v. Muell.* (Violaceae).

A, portion of stem with leaf and pedicel. B, portion of leaf, under-surface. C, flower. D, lower petal. E, stamen, front view. F, stamen, side view. G, style. H, capsule open. I, valve of capsule from within. J, K, seeds.

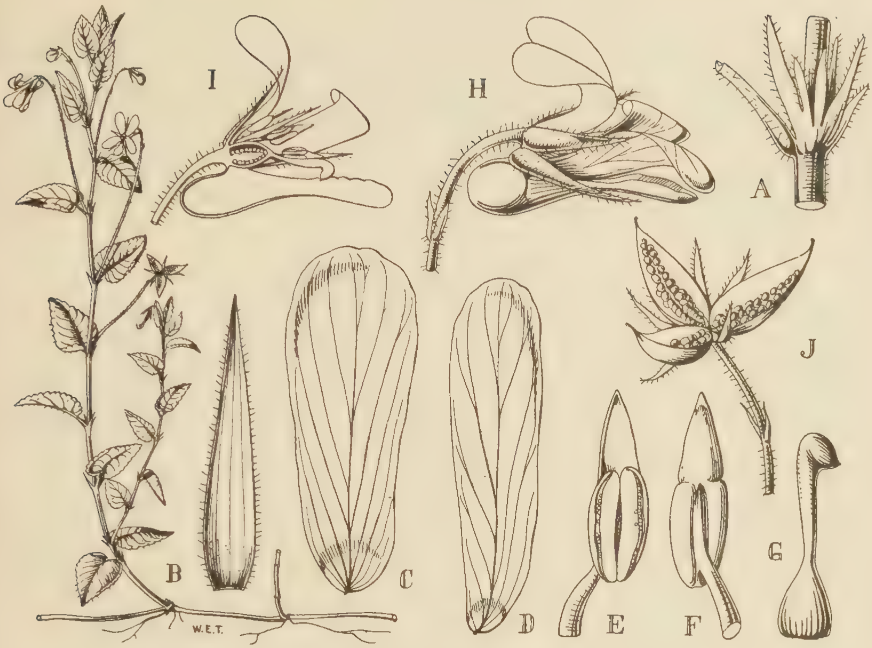

FIG. 34.—VIOLA ABYSSINICA *Steud. ex Oliv.* (VIOLACEAE).

A, portion of stem with stipules. B, sepal. C, D, lateral petals. E, stamen. F, stamen from behind. G, ovary with style. H, flower. I, longitudinal section of flower. J, capsule open.

5. VIOLA Linn.—F.T.A. 1 : 105.

Creeping ; stems up to 60 cm. long, rooting at the nodes, glabrous ; leaves ovate or ovate-orbicular, widely cordate at base, subacute, 1·5–2·3 cm. long, 1–1·5 cm. broad, crenate, more or less sparingly setulose-pubescent on both surfaces, sometimes with dark-coloured scattered linear resinous bodies beneath; petiole shorter than the leaf ; stipules foliaceous, deeply divided into lanceolate acute segments, nearly half as long as the petiole ; flowers solitary on long slender pedicels bibracteate towards the apex ; valves of capsule about 0·5 cm. long .. .. *abyssinica*

V. abyssinica *Steud. ex Oliv.* F.T.A. 1 : 105 (1868) ; R. E. Fries in Act. Hort. Berg. 8 : 3 (1925). Creeping or weakly erect herb; corolla very pale mauve to purple.
S.Nig.: Ikwette Plateau, Obudu, 5,200 ft. (Dec.) *Keay & Savory* FHI 25221 ! **Br.Cam.:** Cam. Mt., 5,200–9,000 ft. (Jan.–Mar.) *Mann* 1331 ! *Maitland* 1013 ! 1324 ! *Brenan* 9358 ! **F.Po:** 10,000 ft. *Mann* 297 ! Between Musola and Moka (Jan.) *Guinea* 1592 ! Widespread in the highlands of tropical Africa.

21. RESEDACEAE

Annual or perennial herbs with watery juice, rarely woody. Leaves alternate, simple or pinnately divided ; stipules small, gland-like. Flowers mostly zygomorphic, hermaphrodite or rarely unisexual, racemose or spicate. Calyx persistent, mostly zygomorphic, 4–7-lobed, imbricate. Petals small and inconspicuous or none, valvate, free or slightly coherent, often laciniate, sometimes with a scale at the base. Disk present, often dilated on the adaxial side. Stamens 3–40, perigynous or on the disk, not covered by the petals in bud ; filaments free or united at the base ; anthers 2-celled, introrse. Ovary of 2–6 free or connate carpels, closed or gaping at the top, each carpel with a separate stigma ; ovules numerous on parietal placentas or at the base of the ovary. Fruit a gaping capsule or baccate. Seeds numerous, kidney- or horse-shoe-shaped ; endosperm absent ; embryo curved or folded.

A small family represented in our area by only one species ; several other species and genera occur in the Sahara North of Lat. 18° N. (see Chev. Fl. Viv. 1 : 250). Recognized by the small flowers with much-divided petals, and parietal ovules.

RESEDA Linn.—F.T.A. 1 : 103.

Stems herbaceous, woody at the base, thinly villous-pilose ; leaves deeply 3-lobed or simple, lobes linear-lanceolate, narrowed at the base, subacute, up to 10 cm. long and 2 cm. broad, thinly pilose ; racemes up to 45 cm. long, rather dense-flowered ; pedicels short ; sepals 6 ; stamens about 40 ; fruits oblong, about 1 cm. long, slightly pilose on the sutures ; seeds reniform, about 1 mm. long, very minutely and closely warted .. .. *villosa*

R. villosa *Coss.* in Bull. Soc. Bot. Fr. 6 : 392 (1859) ; Chev. Fl. Viv. 1 : 250. *R. sudanica* A. Chev. (1900). Robust herb, to 2½ ft. high ; flowers white.
Fr.Sud.: Timbuktu, near Gassa wells (Aug.) *Chev.* 2521. Also in Sahara, Morocco and Algeria.

22. POLYGALACEAE

Herbs, shrubs, climbers or rarely small trees. Leaves alternate, rarely opposite, simple ; stipules none. Flowers hermaphrodite, zygomorphic ; pedicels often articulated. Sepals 5, free, imbricate, the two inner larger, often petaloid, wing-like. Petals 3–5, hypogynous, declinate, outer 2 free or united with the lowermost, upper 2 free or minute and scale-like or 0. Stamens 8, rarely 5 or 4, monadelphous beyond the middle or rarely free, the sheath split above, often adnate to the petals ; anthers erect, 1–2-celled, opening by an apical pore, rarely 2-valved or opening nearly to the base. Torus small or rarely expanded into an annular disk within the stamens. Ovary free, 2-celled or rarely 1-celled or 3–5-celled ; style simple ; ovules solitary in each cell, rarely more, pendulous. Fruit a capsule, samara or drupe. Seeds often pilose, with a conspicuous strophiole ; endosperm mostly present ; embryo straight.

Fairly abundantly represented in our area. Conspicuous by their zygomorphic flowers, often brightly coloured and resembling the *Papilionaceae*, but the ovary consisting of more than one carpel each with one or more pendulous ovules, and often pilose seeds with conspicuous strophiole.

Petals 5, subequal, united into a tube at the base ; fruit drupaceous ; stamens 5 :
  Fruit fleshy, yellow or red ; seeds very densely villous, with copious fleshy endosperm 1. **Carpolobia**
  Fruit hard, crustaceous ; seeds finely hairy, without endosperm .. 2. **Atroxima**
Petals 3, the lateral ones free from the abaxial one (keel) ; shrubs or trees ; fruit indehiscent, samaroid, 1-celled, 1-seeded ; stamens 8 .. .. 3. **Securidaca**
Petals 3, or the remainder minute, the lateral ones united with the abaxial one into a unilateral corolla, the middle petal often crested ; usually herbaceous ; fruit a compressed 2-celled capsule, dehiscing loculicidally at the edges ; stamens 8 4. **Polygala**

1. **CARPOLOBIA** G. Don—F.T.A. 1 : 135.

Keel petal about 16 mm. long, 3–4 mm. broad (i.e. breadth = ¼ length or less), not much broader than the other petals ; outer 3 sepals (2–6 mm. long, 1·5–3·5 mm. broad) smaller than the 2 inner sepals (6–7·5 mm. long, 3–6 mm. broad) :
  Leaves 2–7·5 cm. long, 1–2·8 cm. broad ; branchlets and midribs densely pubescent ; lamina variable in shape, ovate, ovate-elliptic, oblong, or narrowly elliptic, obtuse or rounded at base, more or less acuminate, or obtuse at apex, main lateral nerves more or less parallel and rather close ; racemes 1–2-flowered .. .. 1. *alba*
  Leaves 5–12·5 cm. long, 2·3–4 cm. broad ; branchlets pubescent to glabrescent, midrib sparingly pubescent ; lamina oblong to obovate, rounded to cuneate at base, acuminate, main lateral nerves arching and rather distant; racemes 2–5-flowered 2. *glabrescens*
Keel petal 10–13 mm. long, 3–5 mm. broad (i.e. breadth = ⅓ length or more), twice as broad as the other petals ; outer 3 sepals (2·5–4 mm. long, 2 mm. broad) subequal to the 2 inner sepals (3–4·5 mm. long, 2–3 mm. broad) ; branchlets and midribs pubescent ; leaves very variable in shape and size, ovate, ovate-oblong, oblong, oblong-lanceolate, obovate or almost orbicular, 3·5–13 cm. long, 1·5–6·5 cm. broad, obtuse at base, acuminate at apex ; racemes 2–7-flowered .. .. 3. *lutea*

1. **C. alba** *G. Don*—F.T.A. 1 : 135, partly, including var. *parvifolia* Oliv. ; Chev. Fl. Viv. 1 : 276. *C. parvifolia* (Oliv.) Stapf in Johnston Lib. 578 ; F.W.T.A., ed. 1, 1 : 99 ; Chev. Fl. Viv. 1 : 276. Shrub or small tree to 15 ft. high, in forest ; flowers white with crimson spot at base of the two uppermost petals.
Fr.G.: *Farmar* 193 ! Rio Nunez *Heudelot* 792 ! Conakry (Jan.) *Dalz.* 8071 ! **S.L.:** *Don* ! *Barter* 8 ! Seli R. (Oct.) *Thomas* 3108 ! **Lib.:** Monrovia *Whyte* ! Dukwia R. (fr. July) *Cooper* 101 ! **Iv.C.:** *fide* Chev. *l.c.* **N.Nig.:** Mando, Zaria Prov. (June) *Keay* FHI 25876 ! **S.Nig.:** Calabar (fl. & fr. Feb.) *Thomson* 65 ! *Mann* 2297 ! Oban *Talbot* 1404 ! Eket *Talbot* 3193 ! (See Appendix, p. 25.)
2. **C. glabrescens** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 99 (1927) ; Kew Bull. 1928 : 26. *C. alba* of F.T.A. 1 : 35, partly. A forest shrub, about 10 ft. high ; flowers yellowish-white.
Br.Cam.: Johann-Albrechtshöhe *Staudt* 460 ! Likomba (Nov.) *Mildbr.* 10604 ! **F.Po:** (Dec.) *Mann* 78 ! Also in French Cameroons, Congo and Angola.

3. **C. lutea** *G. Don*—F.T.A. 1 : 136 ; Chev. Fl. Viv. 1 : 276. *C. caudata* Burtt Davy in Kew Bull. 1932 : 257. Shrub or small tree, to 15 ft. high ; petals white with purple marking at base of upper petals, turning orange-yellow ; ripe fruits orange.
S.L.: *Don* ! Scarcies R. (Jan.) *Sc. Elliot* 4654 ! Njala (Feb.) *Deighton* 3365 ! Tikonko, Dama (Jan.) *Deighton* 3888 ! **Lib.:** Dukwia R. (Feb., July) *Linder* 95 ! *Cooper* 165 ! **Iv.C.:** Abidjan (Jan.) *Aubrév.* 179 ! And other localities *fide* Chev. *l.c.* **G.C.:** W. Apollonia (Aug.) *Chipp* 330 ! 335 ! Wassaw F.R. (Feb.) *Vigne* 255 ! Kwahu Prasu (Feb.) *Vigne* 1619 ! **Togo:** Lome *Warnecke* 473 ! **Dah.:** Porto Novo (Jan.) *Chev.* 22780 ! **S.Nig.:** Lagos (Aug.–Apr.) *Barter* 2149 ! *Dalz.* 1040 ! *Rowland* ! Abeokuta (Dec.) *Barter* 3354 ! *Burtt* B. 5 ! Okomu F.R. (Jan., Feb.) *Brenan* 9059 ! 9129 ! Sapoba *Kennedy* 424 ! Eket *Talbot* ! Calabar (Feb.) *Mann* 2298 ! **Br.Cam.:** S. Bakundu F.R. (Mar.) *Brenan & Onochie* 9308 ! (See Appendix, p. 25.)

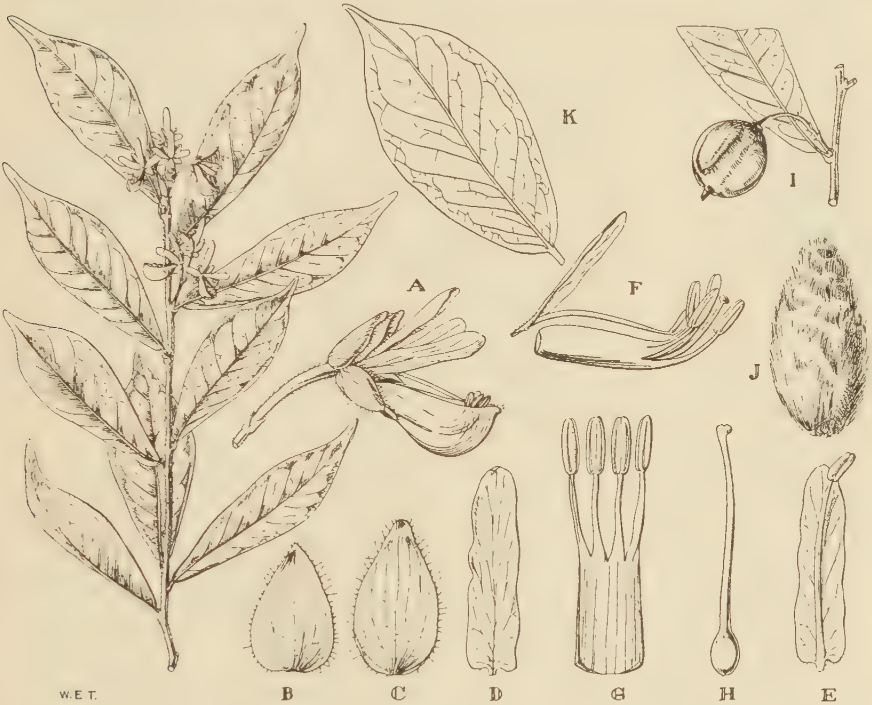

FIG. 35.—CARPOLOBIA LUTEA *G. Don* (POLYGALACEAE).

A, flower. B, C, sepals. D, upper petal. E, the same with adnate stamen. F, staminal sheath with upper petal. G, 4 united stamens. H, ovary with style. I, fruit. J, seed. K, broader leaf.

2. ATROXIMA Stapf in J. Linn. Soc. 37 : 85 (1905).

Leaves rounded to subcordate at base, very closely and prominently reticulate on both surfaces with tertiary nerves not markedly subparallel to the main laterals, oblong-elliptic, subcaudate-acuminate, acumen often oblique, 10–15 cm. long, 4–6 cm. broad ; petiole about 5 mm. long ; racemes 3–6 cm. long, glabrous or sparsely pubescent .. .. 1. *liberica*

Leaves mostly cuneate at base, prominently reticulate on both surfaces with tertiary nerves markedly subparallel to the main laterals, elliptic, acumen usually not oblique, 7–12 cm. long, 2·5–5·5 cm. broad ; petiole about 8 mm. long ; racemes 3–10 cm. long, pubescent .. .. 2. *afzeliana*

1. **A. liberica** *Stapf* in J. Linn. Soc. 37 : 85 (1905) ; Stapf in Johnston Lib. 578, t. 246. Glabrous liane in swamp forest (*fide* Linder) ; flowers cream, two upper petals with purplish markings.
Lib.: Sinoe Basin *Whyte* ! Moala (Nov.) *Linder* 1361 ! Yeh R. (Oct.) *Linder* 989 ! **G.C.:** Ancobra estuary (fr. Jan.) *Akpabla* 817 ! **Br.Cam.:** Barombi *Preuss* 400 ! Also in French Cameroons and Gabon.

2. **A. afzeliana** (*Oliv.*) *Stapf* in J. Linn. Soc. 37 : 86 (1905) ; Chev. Fl. Viv. 1 : 277 (excl. syn. *A. liberica* Stapf). *Carpolobia afzeliana* Oliv. F.T.A. 1 : 136, in obs. (1868). *Carpolobia macrostachya* Chodat in Bull. Herb. Boiss. 5 : 117 (1897). *Atroxima macrostachya* (Chodat) Stapf l.c. 86 ; F.W.T.A., ed. 1, 1 : 99. *A. liberica* of Chev. Bot. 44, not of Stapf. A glabrous shrub or tree with sweeping branches, sometimes scandent, to 25 ft. high ; flowers cream or mauve ; fruit globose, crustaceous, about 1 in. diam., edible.
Fr.G.: *Heudelot* 712. Pita (Dec.) *Jac.-Fel.* 662 ! Labé (fl. & fr. Apr.) *Chev.* 12388 ! Dalaba (Sept.) *Chev.* 20283 ! **S.L.:** *Afzelius* ! Kofiu, Scarcies R. (Jan.) *Sc. Elliot* 4618. Talla Hills (Feb.) *Sc. Elliot* 4897 ! Kabusa (fr. Apr.) *Sc. Elliot* 5472 ! Bumbuna (Oct.) *Thomas* 3425 ! 3892 ! Musaia (Dec.) *Deighton* 4516 ! **Iv.C.:** Bingerville (fr. Feb.) *Chev.* 17351 ! *Jolly* 327 ! Dyolas (fr. May) *Chev.* 21571 ! **S.Nig.:** Olokemeji (Nov.) *Jones & Keay* FHI 14529 ! Also in French Cameroons. (See Appendix, p. 25.)

3. SECURIDACA Linn.—F.T.A. 1 : 134.

Branchlets glabrous, or nearly so ; leaves broadly elliptic, shortly acuminate, 5–10 cm. long, 3–5·5 cm. broad, glossy above, glabrous beneath ; inflorescence branched ; fruit about 5–6·5 cm. long, the wing about 1·5–2 cm. broad, with a small second imperfect wing .. .. 1. *welwitschii*

Branchlets softly pubescent ; leaves oblong-lanceolate, rounded at apex, 2–5 cm. long, up to 2 cm. broad, very minutely pubescent beneath ; inflorescence a simple raceme ; fruit about 5 cm. long, the wing 1·5–2 cm. broad, sometimes with a very small second imperfect wing .. 2. *longepedunculata*

1. **S. welwitschii** *Oliv.* F.T.A. 1 : 135 (1868) ; Chev. Fl. Viv. 1 : 273. *S. timboensis* Pobéguin—Chev. Bot. 43. Scandent shrub or lofty climber up to 80 ft. ; flowers white, often pink at the base of the petals, or yellowish.
Fr.G.: Bembaya (Feb.) *Chev.* 20681 ! Moli (Nov.) *Chev.* 34534 ! **Lib.**: *Dinklage* 3353 ! Ganta (fr. Feb.) *Baldwin* 11013 ! **S.Nig.**: Sapoba *Kennedy* 2063 ! Nun R. (Sept.) *Mann* 477 ! Oban *Talbot* 1474 ! **Br.Cam**: Cameroons R. (Jan.) *Mann* 2223 ! Buea, 2,500 ft. (fr. Mar.) *Maitland* 569 ! Johann-Albrechtshöhe *Staudt* 524 ! Mamfe *Maitland* 1159 ! Extends to Uganda and Angola.

2. **S. longepedunculata** *Fres.*—F.T.A. 1 : 134 ; Chev. Fl. Viv. 1 : 273. Shrub or small tree up to 20 ft. high, with pale bark ; flowers purple, fragrant ; widespread in savannah vegetation.
Sen.: Cayor *Heudelot* 407 ! *Sieber* 27 ! **Gam.**: *Dawe* 45 ! *Hayes* 511 ! North bank of R. Gambia (July) *Ozanne* 24 ! **Fr.Sud.**: Sebekoro (Feb.) *Dubois* 89 ! **Fr.G.**: Kouroussa (May) *Pobéguin* 888 ! **S.L.**: Falaba (Mar.) *Sc. Elliot* 5140 ! **Iv.C. & Fr.Nig.**: *fide* Chev. *l.c.* **G.C.**: Lorha, N.T. (Feb.) *McLeod* 818 ! Yendi (Apr.) *Vigne* 1687 ! Tamale (Apr.) *Williams* 118 ! Afram Plains *Irvine* 618 ! **Dah.**: Atacora Mts. (June) *Chev.* 24148 ! **N.Nig.**: Sokoto *Ryan* 26 ! Nupe *Barter* 1198 ! Bauchi Plateau (Jan.) *Lely* P. 64 ! **S.Nig.**: Lagos *Foster* 24 ! Olokemeji (Apr.) *Foster* 276 ! Widespread in tropical Africa. (See Appendix, p. 27.)

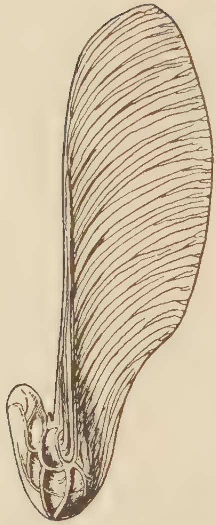

FIG. 36.—SECURIDACA WELWITSCHII *Oliv.* (POLYGALACEAE).
Fruit.

4. POLYGALA Linn.—F.T.A. 1 : 125 ; Chodat Monogr. Polygal. 1 (1891).[1]

Lateral sepals less than 3 mm. long ; with 3 principal unbranched nerves ; small herbs with linear or acicular leaves up to 1·5 cm. long and 2·5 mm. broad :

Seeds without aril ; posterior and anterior sepals subequal ; lateral sepals glabrous ; stems very slender and rather sparsely branched ; leaves up to 1 mm. broad :

Seeds narrowly oblong-ovoid, 3 times as long as broad, densely pilose with the hairs extended beyond the blunt end of the seed to form a " tail " ; plant to 25 cm. high, racemes up to 6 cm. long, laxly flowered ; lateral sepals 2–2·5 mm. long, 1–1·25 mm. broad ; pedicels about ½ as long as flower ; capsule oblong-ellipsoid 1. *lecardii*

Seeds oblong-orbicular to oblong-ovoid, less than twice as long as broad, rather sparsely clothed with more or less spreading hairs, hairs not extended to form a " tail " ; plant to 25 cm. high, racemes up to 5·5 cm. long, densely flowered except towards the base ; lateral sepals 1·5–2·2 mm. long, narrowly obovate ; pedicels about ¼ as long as flower ; capsule suborbicular ; leaves up to 1·5 cm. long, usually much less .. .. 2. *micrantha*

Seeds arillate, pilose ; posterior sepal about twice as large as the anterior ; lateral sepals oblanceolate to narrowly elliptic, pubescent, about 2·5 mm. long ; much-branched leafy herb to 30 cm. high, leaves up to 1·5 cm. long and 2·5 mm. broad 3. *myriantha*

Lateral sepals well over 3 mm. long ; larger herbs or undershrubs ; lateral sepals generally with branched and anastomosing nerves :

Lateral sepals deciduous in fruit :

All the sepals deciduous in fruit :

Leaves broadly ovate-orbicular, pilose with long-ciliate margins ; lateral sepals about 6 mm. long, anterior sepals united ; racemes terminal, up to 15 cm. long, densely flowered ; seeds conical, long-pilose .. .. 4. *bennae*

Leaves elliptic with acuminate apex and cuneate base, sparsely setulose ; lateral sepals about 9 mm. long, anterior sepals united ; racemes axillary, up to 7 cm. long, densely flowered ; seeds conical, short-pilose .. .. .. 5. *cabrae*

Only the lateral sepals deciduous ; leaves filiform or acicular :

Anterior sepals free ; stems herbaceous, slender with scattered filiform leaves up to 3 cm. long ; inflorescence elongated, slender, simple with scattered flowers ; pedicels about ½ as long as flower, slender ; fruit widely bilobed 6. *guineensis*

Anterior sepals connate, stems woody, densely leafy, the leaves mostly in clusters, acicular, up to 5 cm. long ; inflorescence dense, mostly branched ; pedicels very short and stout ; fruits deeply notched .. .. 7. *acicularis*

Lateral sepals persistent and often membranous in fruit :

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[1] Revised in collaboration with P. Taylor of Kew.

Anterior sepals connate :

Keel-petal not cristate ; lateral sepals with conspicuous coloured nerves, distinctly clawed at the base, 4–5 mm. long, about equal to the fruit in length and not completely hiding it ; seeds densely long-pilose all over :

Sparingly branched slender herb ; leaves linear, acute, less than 3 mm. broad ; racemes up to 20 cm. long, flowers rather distantly spaced .. 8. *petitiana*

Much-branched leafy herb ; leaves lanceolate, 3–6 mm. broad ; racemes up to 12 cm. long, flowers rather crowded .. .. 9. *xanthina*

Keel-petal cristate, lateral sepals faintly veined, scarcely clawed, longer than the fruit and completely hiding it ; stems deeply grooved, glabrous ; seeds shortly pilose :

Lateral sepals 6–8 mm. long ; leaves up to 7 cm. long ; often with several lateral inflorescences ; seeds rather sparingly short-pilose .. .. 10. *rarifolia*

Lateral sepals 3·5–4·5 mm. long ; leaves up to 16 mm. long ; inflorescence terminal ; seeds rather densely short-pilose.. .. .. 11. *atacorensis*

Anterior sepals not connate, sepals all free :

Flowers in short lateral racemes crowded amongst the leaves, never in terminal racemes ; leaves linear to lanceolate, obtuse or subobtuse, shortly pubescent, up to 2·5 cm. long ; lateral sepals pubescent ; fruits oblong-obovate, ciliate ; seeds narrow, long-pilose all over .. .. 12. *erioptera*

Flowers in terminal racemes, sometimes also with axillary racemes :

Flowers in dense, often subcapitate, terminal and often also numerous axillary racemes, shorter than the leaves and exceeded by the upper leaves :

Flowers in dense terminal head-like racemes ; plant of sympodial growth so that floriferous secondary branches much exceed the primary terminal raceme ; leaves linear to broadly oblanceolate, very variable, up to 7 cm. long and 1 cm. broad ; lateral sepals long, becoming whitish in fruit, pubescent ; fruits elliptic, glabrous ; seeds oblong, long-pilose all over .. 13. *arenaria*

Flowers in oblong racemes, plant of monopodial growth with the primary terminal raceme above the numerous short secondary floriferous branches ; leaves linear to oblong-linear, attenuate at each end, 2–6 cm. long, 1–6 mm. broad ; lateral sepals about 5 mm. long, glabrous ; fruit oblong, emarginate, narrowly winged, ciliate ; seeds pilose .. .. 14. *stanleyana*

Flowers in elongated racemes much exceeding the upper leaves :

Ovary and fruit glabrous on the margin, the latter narrowly winged :

Seeds conical, densely pilose, with the aril completely covered by long hairs ; flowers laxly arranged in elongated racemes ; lateral sepals 5–5·5 mm. long, 4–4·5 mm. broad, sparsely puberulous ; leaves linear-oblanceolate, obtuse, up to 3·5 cm. long, appressed-pubescent.. .. .. .. 15. *irregularis*

Seeds oblong, aril not hidden by hairs ; flowers densely arranged :

Seeds glabrous except at the tips, 4·5–6 mm. long, aril much reduced ; flowers in long, dense racemes ; lateral sepals 8–9 mm. long and 7 mm. broad, glabrous ; stems softly pubescent; leaves linear, acute, 8–16 cm. long, 0·5–1 cm. broad, midrib very prominent .. .. .. 16. *butyracea*

Seeds pubescent, with a tuft of bristles from the relatively large aril, about 4·5 mm. long ; flowers in short dense racemes ; lateral sepals elliptic, glabrous; posterior sepal hirsute ; anthers setose ; leaves linear, 5–8 cm. long, 0·5–1 cm. broad .. .. 17. *pobeguinii*

Ovary and fruit ciliate on the margin, the latter not usually winged ; seeds pilose, arillate :

Ovary and fruit glabrous except on the margin ; lateral sepals glabrous or ciliate ; leaves well over 3 cm. long :

Keel-petal very distinctly cristate ; pedicals pubescent :

Leaves linear, 5–20 cm. long, up to 8 mm. broad, usually 4–6 mm. ; stems sparingly branched with one to a few stiffly erect narrow racemes ; pedicels short, about 1 mm. long, flowers rather crowded :

Lateral sepals 5–7 mm. long, glabrous, shorter than the shortly crested keel petal .. .. 18. *baikiei*

Lateral sepals 8–10 mm. long, glabrous, longer than the longly crested keel petal .. .. 19. *cristata*

Leaves lanceolate, 4–9 cm. long, 0·8–2·5 cm. broad ; stems sparingly branched with numerous axillary as well as terminal racemes 2–15 cm. long ; pedicels slender about 4 mm. long, flowers crowded ; lateral sepals 6–8 mm. long and broad, ciliate to glabrescent .. .. .. 20. *persicariifolia*

Keel-petal slightly cristate ; pedicels glabrous, slender, about 3 mm. long, flowers rather lax in numerous long terminal racemes ; lateral sepals 4·5–6 mm. long, glabrous ; stems slender, well-branched ; leaves linear, 2–10 cm. long, 1·5–4 (rarely to 8) mm. broad .. .. 21. *multiflora*

Ovary and fruit hairy over the surface as well as the margin ; lateral sepals pubescent all over ; leaves up to 3 cm. long :

Racemes dense-flowered, flowers contiguous ; flowers and axes densely pilose :

Leaves linear or linear-filiform, up to 1 mm. broad ; inflorescence with numerous stiffly erect racemes, lateral sepals 4–5 mm. long, 3 mm. broad, densely pilose ; seeds densely long-bristly .. .. 22. *ukirensis*

Leaves narrowly linear-lanceolate up to 3 mm. broad ; inflorescence with several erect densely flowered racemes ; lateral sepals 5–6 mm. long, 4·5–5 mm. broad, pilose ; seeds sparingly pubescent except for the "tail" 23. *tenuicaulis*

Racemes more or less lax, flowers scattered ; flowers and axes shortly pubescent ; inflorescence simple or sparingly branched ; lateral sepals 4–6 mm. long, 4 mm. broad, pubescent ; seeds pilose ; leaves linear or linear filiform, up to 1 mm. broad .. .. 24. *sparsiflora*

1. **P. lecardii** *Chodat* Monogr. Polygal. 222 (1891) ; Chev. Fl. Viv. 1 : 261. *P. paludosa* of F.T.A. 1 : 131, not of St.-Hil. *P. clarkeana* Chodat in Bull. Herb. Boiss. 4 : 235 (1896) ; F.W.T.A., ed. 1, 1 : 101. [Not *P. clarkeana* of Chev. Fl. Viv. 1 : 262.] *P. pygmaea* of Chev. Bot. 41. Erect annual, up to 1 ft. high ; flowers white, pink, blue or purple.
Fr.Sud.: *Lecard* 150. **Fr.G.:** *Jac.-Fel.* 618*g* ! **S.L.:** *Brown* ! Freetown (Oct.) *Deighton* 2056*b* ! (Aug.) *Jordan* 68 ! Waterloo *Burbridge* 142 ! (Aug.) *Deighton* 2056 ! Bonthe (Oct.) *Adames* 95 ! Rokupr (Nov.) *Jordan* 160 !

2. **P. micrantha** *Guill. & Perr.* Fl. Seneg. 1 : 39 (1831) ; F.T.A. 1 : 131, partly (excl. *Welw.* spec.) ; Chodat Monogr. Polygal. 217 ; Chev. Fl. Viv. 1 : 263. *P. paludosa* of Chev. Bot. 41, not of St.-Hil. *P. clarkeana* of Chev. Fl. Viv. 1 : 262, not of Chodat. Erect annual, up to 1 ft. high ; flowers white or mauve.
Sen.: *Perrottet* ! **Fr.G.:** Kouroussa *Pobéguin* 335 ! Fouta Djalon (Sept., Oct.) *Chev.* 18376 ! *Jac.-Fel.* 584 ! **S.L.:** Makali (July) *Deighton* 4397 ! **Lib.:** Painesville (Oct.) *Harley* 1683 ! **Iv.C.:** Maravne *Chev.* 21882. **N.Nig.:** Kontagora (Jan.) *Meikle* 1093 ! Abinsi (Sept.) *Dalz.* 786 ! Sho (Nov.) *Keay* FHI 21019 ! Bauchi Plateau, Vom *Dent Young* 11 ! **Br.Cam.:** Bamenda (June) *Maitland* 1397 !

3. **P. myriantha** *Chodat* in Engl. Bot. Jahrb. 48 : 321 (1912) ; Exell & Mendonça in Consp. Fl. Ang. 1 : 96. Annual herb, flowers mauve.
Br.Cam.: Bamenda, 3,500 ft. (Apr.) *Maitland* 1411 ! Also in French Cameroons, Belgian Congo, Angola, Uganda and Tanganyika.

4. **P. bennae** *Jac.-Fel.* in Bull. Mus. Hist. Nat. 10 : 440 (1938) ; Chev. Fl. Viv. 1 : 261. Undershrub, 12–15 in. high ; flowers pink.
Fr.G.: Benna, 2,500 ft. (Dec.) *Jac.-Fel.* 2138 !

5. **P. cabrae** *Chodat* in Bull. Herb. Boiss. 6 : 838 (1898) ; Exell & Mendonça l.c. 1 : 94. Straggling perennial with prostrate woody stems and slender leafy branches.
Br.Cam.: Kumba (July) *Olorunfemi* FHI 30695 ! Also in Cabinda and Belgian Congo.

6. **P. guineensis** *Willd.*—F.T.A. 1 : 132 ; Chodat Monogr. Polygal. 371 ; Chev. Fl. Viv. 1 : 271. Erect glabrous annual, forking, with striate stems, up to 2 or 3 ft. high ; flowers 4–5 mm. long, sepals greenish, corolla lilac to red.
Iv.C.: Baoulé-Nord, Mt. Kangoroma (July) *Chev.* 22168 ! **G.C.:** Accra (May, June) *Ansell* ! *Dalz.* 128 ! *Irvine* 459 ! 1762 ! Navrongo (Sept.) *Vigne* 4576 ! **Togo:** Lome *Warnecke* 225 ! **N.Nig.:** Nupe *Barter* 1556 !

7. **P. acicularis** *Oliv.* F.T.A. 1 : 132 (1868) ; Chodat l.c. 368 ; Chev. Fl. Viv. 1 : 270 ; Exell & Mendonça l.c. 104. A low glabrous shrubby herb, to 3 ft. high, with stout rigid branches ; flowers 6–8 mm., whitish to blue-purple.
N.Nig.: Bennett Mts. *Barter* 567 ! Lokoja (Sept., Oct.) *Parsons* 14 ! *Dalz.* 89 ! Bauchi Plateau (July, Aug.) *Lely* 373 ! P. 583 ! R. Benue *Talbot* ! Also in A.-E. Sudan, Uganda and Angola.

8. **P. petitiana** *A. Rich.*—F.T.A. 1 : 133 ; Chodat l.c. 370 ; Exell & Mendonça l.c. 108 ; Chev. Fl. Viv. 1 : 270. *P. volkensii* Gürke in Engl. Pflanzenw. Ost-Afr. C. 234 (1895) ; F.W.T.A., ed. 1, 1 : 101. [Not *P. volkensii* of Chev. Fl. Viv. 1 : 271.] Erect, simple or sparingly branched annual, with long slender stems 2–3 ft. high ; corolla blue or purple, lateral sepals green with conspicuous dark veins.
Fr.Sud.: Gourma (July) *Chev.* 24383 ! 24503 ! **N.Nig.:** Sokoto (July) *Dalz.* 569 ! Zungeru (Aug.) *Dalz.* 60 ! Anara F.R., Zaria (July) *Keay* FHI 25973 ! Bauchi Plateau (June–Aug.) *Lely* 275 ! 472 ! P. 349 ! P. 713 ! *Keay* FHI 20065 ! Widespread in east and south tropical Africa.

9. **P. xanthina** *Chodat* in Engl. Bot. Jahrb. 48 : 325 (1912). Leafy, much-branched herb, 1 ft. high or more ; flowers yellow or pinkish.
N.Nig.: Anara F.R., Zaria (Sept.) *Olorunfemi* FHI 24402 ! Vom, Bauchi Plateau *Dent Young* 12*a* ! Also in Katanga, Uganda, Tanganyika and N. Rhodesia.

10. **P. rarifolia** *DC.*—F.T.A. 1 : 132 ; Chodat Monogr. Polygal. 367 ; Chev. Fl. Viv. 1 : 272. Erect with slender glabrous branches, sometimes reaching 8–9 ft. in height ; flowers deep blue.
Fr.G.: Rio Nunez *Heudelot* 641 ! Maneah (July) *Pobéguin* 777 ! Soudougou (July) *Collenette* 73 ! **S.L.:** *Afzelius* ! *Don* ! Heddles Farm (Oct.) *Lane-Poole* 413 ! Rowala (July) *Thomas* 1208 ! Port Loko (Dec.) *Thomas* 6668 ! Bumban, N.P. (Aug.) *Deighton* 1225 ! Hill Station (Sept.) *Deighton* 2163 !

11. **P. atacorensis** *Jac.-Fel.* in Bull. Soc. Bot. Fr. 99 : 66 (1952). *P. triquetra* A. Chev. in Bull. Soc. Bot. Fr. 58, Mém. 8 : 138 (1912), not of Presl. (1844). *P. volkensii* of Chev. Fl. Viv. 1 : 271, not of Gürke. Erect herb, branched from the base, to 15 in. high ; flowers blue.
Dah.: Atacora Mts. (June) *Chev.* 24041 !

12. **P. erioptera** *DC.*—Chodat l.c. 342 ; Chev. Fl. Viv. 1 : 265. *P. triflora* of F.T.A. 1 : 128, partly, not of Linn. Erect annual 1–2 ft. high, or diffuse and much-branched, pubescent ; flowers about 5 mm. long, pink-tipped.
Sen.: *Roger* 28 ! Walo and Kouma *Perrottet* ! **Fr.Sud.:** Timbuktu (July) *Hagerup* 168*a* ! Several localities *fide* Chev. *l.c.* **G.C.:** Zuarungu (Sept.) *Hughes* FH 5332 ! **N.Nig.:** Sokoto (July) *Dalz.* ! Katagum (Jan.) *Dalz.* 307 ! Nguru (June) *Onochie* FHI 23347 ! Kukawa (Jan.) *E. Vogel* 4 ! Widespread from Cape Verde Islands, throughout tropical Africa to Arabia, Persia and India.

13. **P. arenaria** *Willd.*—F.T.A. 1 : 128, partly ; Chodat l.c. 337 ; Chev. Fl. Viv. 1 : 263. An annual, erect or diffuse and much-branched, from a few inches to a foot or more in height ; lateral petals yellowish, keel-petal pink to purple, widely distributed over the whole area.
Sen.: *Talmy* ! Various localities *fide* Chev. *l.c.* **Gam.:** *Brown-Lester* 31 ! **Fr.G.:** Kouroussa (Aug.) *Pobéguin* 372 ! **Fr.Sud.:** Ouala (Dec.) *Chev.* 39 ! Segou (Sept.) *Chev.* 2531 ! **S.L.:** Yonibana (Oct.) *Thomas* 4095 ! Rogbassa, N.P. (Aug.) *Deighton* 1267 ! Musaia (Sept., Dec.) *Deighton* 4490 ! 4888 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Accra (Oct.) *Brown* 397 ! *Dalz.* 135 ! Zandiregu, N.T. (Nov.) *Darko* 447 ! **Togo:** Lome *Warnecke* 179 ! Basari *Kersting* A. 669 ! *Schröder* 108 ! **Fr.Nig.:** Niamey *Hagerup* 473 ! **N.Nig.:** Sokoto (Dec.) *Dalz.* 385 ! Nupe *Barter* 929 ! 1555 ! Bauchi Plateau (Jan., Aug.) *Lely* P. 66 ! P. 601 ! **S.Nig.:** Lagos (Sept.) *Punch* 28 ! Onitsha *Barter* 1804 ! Extending to east and south tropical Africa. (See Appendix, p. 26.)

14. **P. stanleyana** *Chodat* l.c. 340 (1891) ; Chev. Fl. Viv. 1 : 264 ; Exell & Mendonça l.c. 102. Herb, to 1½ ft. high ; sepals mauve-pink, petals white.
Fr.G.: Fouta Djalon, Dalaba, 3,000–4,000 ft. (Sept.-Oct.) *Chev.* 18822 ! **N.Nig.:** Bauchi Plateau, 4,000 ft.,

Vom *Dent Young* 10 ! Jos (Aug.) *Keay* FHI 12699 ! 20160 ! **Br.Cam.:** Bamenda, 5,000 ft. (May) *Maitland* 1441 ! Also in French Cameroons, Uganda, Congo and Angola.

15. **P. irregularis** *Boiss.* Diag. 1 : 8 (1842) ; F.T.A. 1 : 131 ; Chodat l.c. 392 ; F.W.T.A., ed. 1, 2 : 605. *P. obtusata* Auct. non DC. ; F.W.T.A., ed. 1, 1 : 101 ; Chev. Fl. Viv. 1 : 269. *P. hagerupii* Exell in J. Bot. 68 : 244 (1930). Suffrutescent with wiry branches, $1\frac{1}{2}$–2 ft. high, in sandy places, flowering at all seasons.

Sen.: *Thierry* 134 ! *Richard* ! *Leprieur* ! **Fr.Sud.:** Timbuktu (July) *Chev.* 1280. **Fr.Nig.:** Zinder (Oct.) *Hagerup* 577 ! Also in central Sahara, A.-E. Sudan, Egypt and Arabia.

16. **P. butyracea** *Heckel* in Bull. Soc. Geogr. Marseille 13 : 222 (1889) ; Chodat l.c. 333 ; Oliv. in Hook. Ic. Pl. t. 2301 ; Chev. Fl. Viv. 1 : 266. Stout herb, with long branches, to 6 ft. or more high, cultivated ; annual, or perennial (?) ; flowers white, pink or yellowish.

Fr.G.: *fide* Chev. *l.c.* **S.L.:** *Hart* ! Kitchom (Dec.) *Sc. Elliot* 4072 ! Batkanu (Feb.) *Glanville* 167 ! Njala (Dec.) *Deighton* 1799 ! **G.C.:** Tamale (Nov.) *Williams* 814 ! **N.Nig.:** Abinsi *Dalz.* 726 ! Yandev (Dec.) *Sampson* 30*a* ! (See Appendix, p. 26.)

17. **P. pobeguinii** *A. Chev. & Jac.-Fel.* in Bull. Mus. Hist. Nat. 10 : 442 (1938) ; Chev. Fl. Viv. 1 : 268. Herb, to 2 ft. high ; flowers violet-purple.

Fr.G.: Socotoro *Pobéguin* 1868.

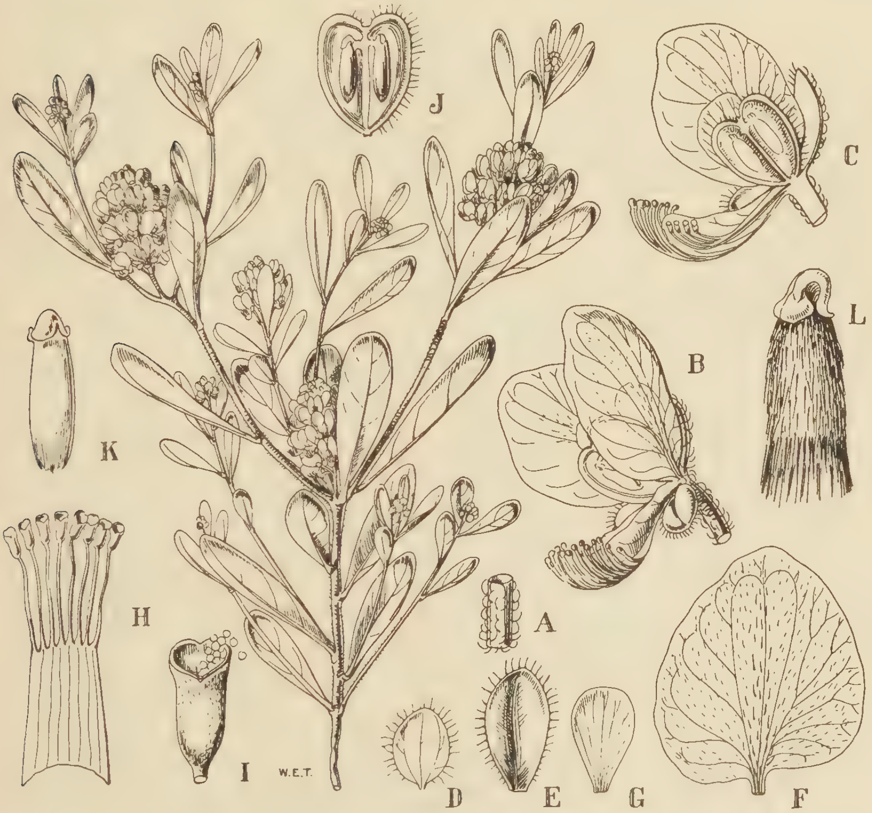

FIG. 37.—POLYGALA ARENARIA *Willd.* (POLYGALACEAE).

A, portion of stem showing curved hairs. B, flower. C, longitudinal section of flower. D, E, outer sepals. F, wing sepal. G, lateral petal. H, staminal sheath. I, anther with terminal pore. J, longitudinal section of ovary. K, ovule. L, seed.

18. **P. baikiei** *Chodat* l.c. 334 (1891) ; Chev. Fl. Viv. 1 : 226. *P. tenuicaulis* Hook. f. var. *longifolia* Oliv. F.T.A. 1 : 127. Erect, to 5 ft. high ; flowers deep mauve, pink or red.

Fr.Sud.: Ouagadougou (Aug.) *Chev.* 24731. **Fr.G.:** several localities *fide* Chev. *l.c.* **Iv.C.:** Baoulé *Chev.* 22182. **G.C.:** Kintampo *Kitson* ! **N.Nig.:** Nupe *Barter* 504 ! 782 ! Kabba (Nov.) *Keay* FHI 28101 ! Bauchi Plateau, 3,000–4,500 ft. (Aug.) *Dent Young* 9 ! *Lely* 487 ! P. 584 ! Abinsi (Sept.) *Dalz.* 727 ! **S.Nig.:** Lagos Colony (Sept.) *Millen* 37 ! *Punch* 27 !

19. **P. cristata** *P. Taylor* in Kew Bull. 1953 : 78. Erect to 8 ft. high ; flowers mauve to purple.

S.L.: Jigaya (Sept.) *Thomas* 2564 ! Musaia (Dec.) *Deighton* 4487 ! Gberia Fotumbu (Sept.) *Small* 289 ! Warantamba (Oct.) *Small* 373 !

20. **P. persicariifolia** *DC.*—F.T.A. 1 : 129 ; Chev. Fl. Viv. 1 : 269. Annual herb, to $3\frac{1}{2}$ ft. high ; lateral sepals and corolla magenta.

Fr.G.: Fouta Djalon, 3,000 ft. (Sept.) *Chev.* 18658. **S.L.:** Musaia (fr. Dec.) *Deighton* 4536 ! **N.Nig.:** Bauchi Plateau, Riyom (Aug.) *Keay* FHI 20091 ! Widespread in tropical Africa and Asia.

21. **P. multiflora** *Poir.*—F.T.A. 1 : 127 ; Chev. Fl. Viv. 1 : 267. *P. senegambica* Chodat l.c. 334 ; Chev. Bot. 41 (incl. var.). *P. donii* Hook. f. in Fl. Nigrit. 222. Erect, branched herb to 6 ft. high ; flowers blue or purple.

Sen.: *Lecard* 169. Bondou *Heudelot* 203. **Gam.:** *Hayes* 569! Kuntaur (July) *Ruxton* 56! **Fr.G.:** Kouroussa (July) *Pobéguin* 334! Macenta (Oct.) *Baldwin* 9782! And various localities *fide* Chev. *l.c.* **Fr.Sud.:** Koulikoro (Oct.) *Chev.* 2529! **S.L.:** *Don*! *Brown*! Leicester Peak (Dec.) *Sc. Elliot* 3856! Bonthe Isl. (Nov.) *Deighton* 2290! Dodo (Apr.) *Deighton* 3906! Jigaya (Nov.) *Thomas* 2543! Kenema (Oct.) *Deighton* 5228! **Iv.C.:** N'zi, Baoulé-Nord (Aug.) *Chev.* 22289! And various other localities *fide* Chev. *l.c.* **Togo:** *Büttner* 214! **N.Nig.:** Bauchi Plateau (Aug.) *Dent Young* 13! 14! *Lely* P. 651! **S.Nig.:** Enugu (Nov.) *Ujor* FHI 23940!

22. **P. ukirensis** *Gürke* in Engl. Bot. Jahrb. 14 : 310 (1891). Erect herb, to 3 ft. high ; flowers blue (?) or yellow ; in swamps.
S.L.: Bintumane Peak, 5,400 ft. (Jan.) *T. S. Jones* 79! **Br.Cam.:** Bafut-N'gemba F.R., 5,000–6,000 ft. (Oct.–Nov.) *Lightbody* FHI 26276! Also in Uganda, Kenya, Tanganyika and N. Rhodesia.

23. **P. tenuicaulis** *Hook. f.*—F.T.A. 1 : 127 (excl. var. *longifolia* Oliv.) ; Chodat l.c. 335 ; Chev. Fl. Viv. 1 : 269. Erect annual, usually branched 1–2 or more ft. high ; flowers pink or purplish.
Br.Cam.: Cam. Mt., 7,000–8,000 ft. (Nov.–Feb.) *Mann* 1282! 1982! *Maitland* 963! 1010!

24. **P. sparsiflora** *Oliv.* F.T.A. 1 : 127 (excl. var. β) ; Chev. Fl. Viv. 1 : 268. *P. djalonensis* Chev. Bot. 40. Erect annual, simple or sparingly branched, 2–4 ft. high ; flowers greenish-white or pink.
Fr.G.: Fouta Djalon (Sept.) *Chev.* 18641! **S.L.:** *Morson*! Waterloo (Oct.) *Lane-Poole* 407! Mabang, Kolifa (Jan.) *Glanville* 146! Also in Upper Shari.

23. VOCHYSIACEAE

Large trees, shrubs or climbers. Leaves opposite or verticillate, rarely alternate, simple ; stipules small or absent, or reduced to glands. Flowers hermaphrodite, zygomorphic, racemose or paniculate. Sepals 5, imbricate, the posterior often the largest and gibbous or spurred at the base. Petals 1–5, contorted. Stamens hypogynous or perigynous, only 1 fertile ; filaments free ; anthers 2-celled, opening lengthwise. Ovary superior, or rarely adnate to the calyx and hence practically inferior, often oblique, 1–3-celled ; style 1 ; ovules 1–many in each cell, axile. Fruit capsular or samaroid ; seeds one or more, often winged, sometimes pilose ; endosperm absent or rarely present ; embryo straight.

A large family of tropical America, with only a single genus in Africa.

ERISMADELPHUS Mildbr. in Engl. Bot. Jahrb. 49 : 549 (1913) ; Keay & Stafleu in Acta Bot. Neerl. 1 : 594 (1953).

A tall tree, branchlets densely tomentellous ; leaves opposite, broadly elliptic, sometimes suborbicular, rounded to cordate at base, obtuse to shortly acuminate at apex, petiole 8–15 mm. long, lamina 8–18 (–25) cm. long, 7–11 cm. broad, coriaceous, with 5–8 pairs of main lateral nerves very prominent beneath, midrib and main nerves puberulous ; flowers numerous in subcorymbose terminal panicles, all parts tomentellous ; bracts persistent, sessile, reniform-cordate, about 8 mm. long and 9–10 mm. broad ; sepals 5, the 2 exterior lateral ones obliquely lanceolate, 7 mm. long and 2–2·5 mm. broad ; posterior sepal suborbicular, 4–5 mm. in diam., produced at the base into two blunt superposed spurs ; 2 anterior sepals oblong, 6–7 mm. long, 3–3·5 mm. broad ; petals 5, subequal, 9–10 mm. long, 4·5–6 mm. broad, obovate-rhomboid with a long claw ; ovary adnate to the calyx and hence practically inferior, 1-celled with a single anatropous ovule ; fruit with the anterior sepals enlarged into wings up to 6 cm. long and 2·7 cm. broad, the other sepals enlarged but considerably smaller .. .. *exsul* var. *platyphyllus*

E. exsul *Mildbr.* var. **platyphyllus** *Keay & Stafleu* in Acta Bot. Neerl. 1 : 598 (1953). Straight forest tree to 110 ft. high and 10 ft. girth ; flowers greyish-green.
S.Nig.: Leopard Town, Calabar (fl. Apr., fr. June) *Robson* FHI 1027! Oban (fr. Nov.) *Gray* 6/10! Ikom (fl. & fr. Aug.) *Mackay*! *Catterall* 40! Ukpon F.R. *Kennedy* 3128! **Br.Cam.:** Kumba Div. (fl. Apr.) *Dundas* FHI 8489! *Ejiofor* FHI 29315! Also in Gabon. [*E. exsul* Mildbr. var. *exsul*, occurring in the French Cameroons, Gabon and Belgian Congo, has narrower, glabrous leaves, acutely cuneate at the base.]

24. CRASSULACEAE

Herbs and undershrubs, usually succulent ; leaves opposite or alternate, exstipulate. Flowers actinomorphic, hermaphrodite, usually cymose. Sepals free or united into a tube, often 4 or 5. Petals the same number as the sepals, free or variously connate, hypogynous. Stamens as many or twice as many as the petals, if few then alternate with the petals, slightly perigynous ; filaments free ; anthers 2-celled, introrse, dehiscing longitudinally. Hypogynous scales present within the stamens. Carpels superior, the same number as the petals free or united at the base, 1-celled ; ovules many or rarely few, inserted on the adaxial suture ; styles short or elongated. Fruit follicular, membranous or leathery, often surrounded by the persistent membranous corolla, opening on the adaxial side. Seeds mostly minute, usually with fleshy endosperm ; embryo straight.

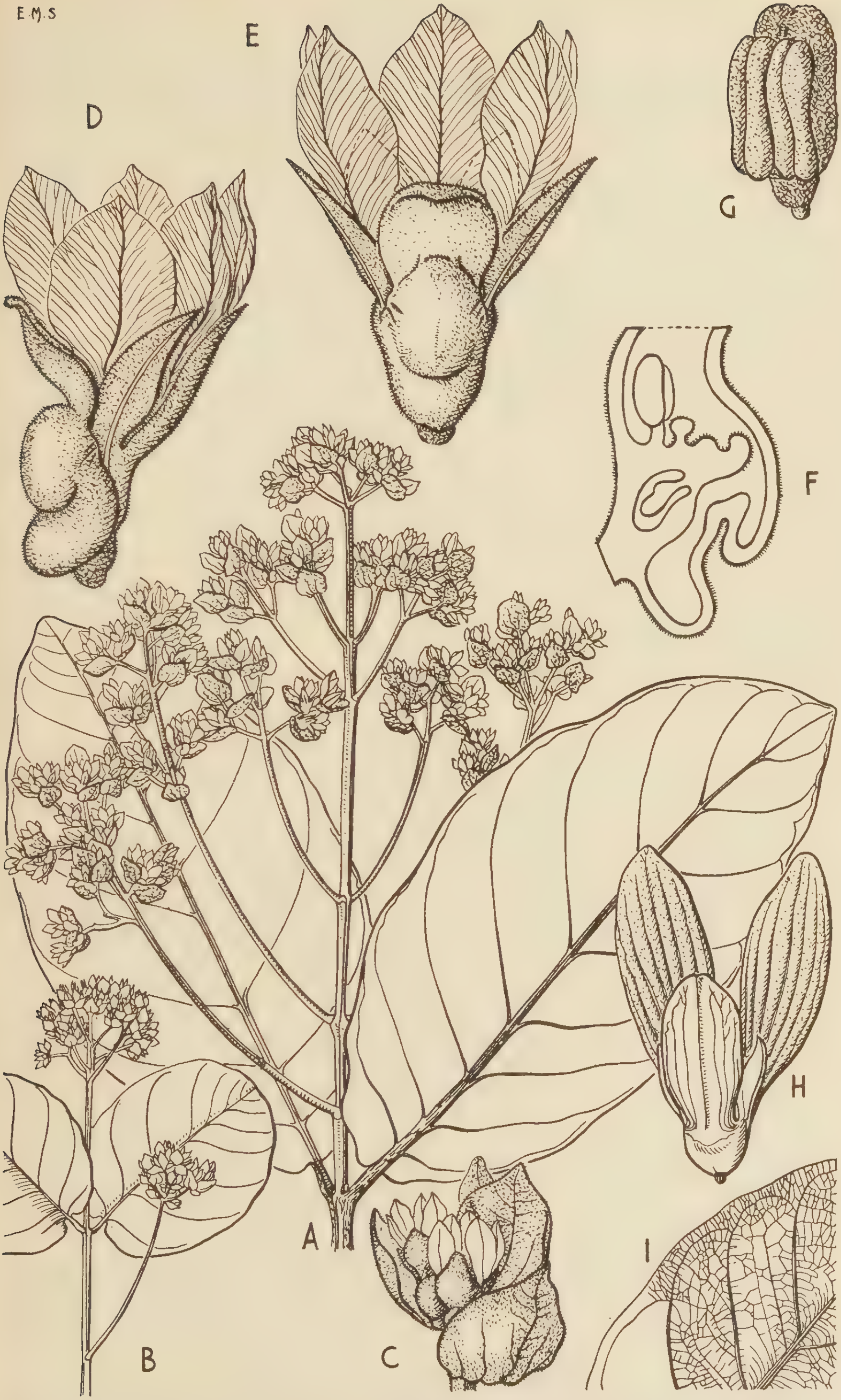

FIG. 38.—ERISMADELPHUS EXSUL var. PLATYPHYLLUS *Keay & Stafleu* (VOCHYSIACEAE).
A, flowering shoot, × ½. B, ditto, × ⅓. C, part of inflorescence, × 2. D & E, flowers, × 4. F, longitudinal section of flower, × 6. G, stamen, × 20. H, fruit, × ⅔. I, undersurface of leaf, × ⅔.
Drawn from *Robson* FHI 1027.

Widely distributed in temperate and tropical regions, especially in mountainous districts, rare in South America and Australasia. Easily recognized by the succulent habit and often opposite leaves, the cymose slightly perigynous flowers, the definite number of stamens, the more or less free carpels and numerous minute seeds.

Flowers small or medium-sized, axillary or corymbose ; petals free or slightly united at the base ; stamens the same number as the petals .. .. 1. **Crassula**
Flowers usually fairly large ; petals united beyond the middle into a tube ; stamens twice the number of the petals :
 Calyx nearly as long as the corolla, becoming inflated and membranous, about 3 cm. long ; flowers in a lax panicle, drooping .. .. 2. **Bryophyllum**
 Calyx much shorter than the corolla, and neither inflated nor becoming membranous ; flowers numerous in cymes or racemes ; corolla becoming membranous and surrounding the carpels :
  Leaves opposite, not peltate ; inflorescence cymose ; sepals 4 .. 3. **Kalanchoe**
  Lower leaves peltate, orbicular, alternate ; inflorescence a simple raceme, rarely with a few basal branches ; sepals 5 .. .. 4. **Umbilicus**

1. **CRASSULA** Linn.—F.T.A. 2 : 388, incl. *Tillaea* Linn.

Flowers very small, axillary ; stems slender, usually with very crowded leaves ; small or prostrate herbs :
 Leaves broadly ovate, subacute, abruptly narrowed into the claw-like base, 1–1·5 cm. long, 6–8 mm. broad ; pedicels about 6 mm. long ; stems with a longitudinal line of hairs .. .. 1. *alsinoides*
 Leaves lanceolate, acute, about 7 mm. long, broadened towards the base ; flowers sessile ; stems angular, nearly glabrous .. .. 2. *pentandra*
 Leaves linear-subulate, very acute, 3–4 mm. long ; flowers pedicellate on very short axillary branchlets ; stems flattened, glabrous .. .. .. 3. *pharnaceoides*
Flowers medium-sized, in dense terminal corymbose cymes ; stems stout, erect ; basal leaves linear-lanceolate, acute, sheathing at the base, up to about 10 cm. long and 1 cm. broad, the cauline ovate-lanceolate, with short broad papillae on the margin ; cymes up to 10 cm. in diam. .. .. 4. *alba*

1. **C. alsinoides** (*Hook. f.*) *Engl.* in Abh. Preuss. Akad. Wiss. 1891, 2 : 231 (1892). *Tillaea alsinoides* Hook. f.—F.T.A. 2 : 387. Fleshy prostrate or ascending herb ; corolla white.
Br.Cam.: Cam. Mt., 5,800–7,600 ft. (Nov.–Mar.) *Migeod* 152 ! *Maitland* 896 ! 1065 ! *Brenan* 9519 ! Nchan, Bamenda, 5,000 ft. (June) *Maitland* 1784 ! L. Oku, Bamenda, 7,800 ft. (Jan.) *Keay* FHI 28473 ! Also on mountains of east and south tropical Africa.

2. **C. pentandra** (*Royle ex Edgew.*) *Schoenl.* in E. & P. Pflanzenfam. 3, 2A : 37 (1890). *Tillaea pentandra* Royle ex Edgew.—F.T.A. 2 : 386. Tufted herb, a few inches high.
Br.Cam.: Cam. Mt., 8,000 ft. (Nov.) *Mann* 2037 ! Also on mountains of E. Africa and Angola, and in India.

3. **C. pharnaceoides** (*Hochst.*) *Fisch. & Mey.* in Ind. Sem. Hort. Petrop. 8 : 56 (1841). *Tillaea pharnaceoides* Hochst.—F.T.A. 2 : 387. Small herb, a few inches high.
Br.Cam.: Cam. Mt., 9,000 ft. (Nov.) *Mann* 1991 ! Also in east and south Africa and N.W. Himalaya.

4. **C. alba** *Forsk.* Fl. Aegypt.-Arab. 60 (1775). *C. mannii* Hook. f. in J. Linn. Soc. 7 : 193 ; F.W.T.A., ed. 1, 1 : 104. *C. abyssinica* A. Rich.—F.T.A. 1 : 388. Erect herb to 3 ft. high. with stout stem ; flowers white.
Br.Cam.: Cam. Mt., 6,000–10,000 ft. (May–Dec.) *Mann* 1304 ! 2036 ! *Maitland* 644 ! 827 ! *Mildbr.* 10861 ! Bambulue Hill, Bamenda, 7,000–7,800 ft. (Sept., Oct.) *Johnstone* 209/31 ! *Savory* 549 ! Widespread in highlands of tropical Africa.

2. **BRYOPHYLLUM** Salisb.—F.T.A. 2 : 389.

A fleshy shrub 60–120 cm. high, branched from the base; leaves opposite, simple or trifoliolate, petiolate, obovate to obovate-orbicular, about 10 cm. long and 5–6 cm. broad, coarsely crenate, sometimes the teeth bearing bulbils in their axils, glabrous ; flowers drooping in lax panicles ; calyx inflated, tubular, 4-lobed, 3 cm. long, greenish-yellow and purplish at the base, lobes triangular, very acute ; corolla gamopetalous, tubular, contracted above the base, a little longer than the calyx, 4-lobed, reddish-purple in the upper part ; lobes ovate-lanceolate, abruptly acute-acuminate ; stamens 8, a little exserted .. .. *pinnatum*

B. pinnatum (*Lam.*) *Oken* in Allg. Naturgesch. 3, 3 : 1966 (1841) ; S. Kurz in J. As. Soc. Beng. 40, 2 : 52 (1871) ; Chev. Fl. Viv. 1 : 280. *Cotyledon pinnata* Lam. Encyl. 2 : 141 (1786). *B. calycinum* Salisb.—F.T.A. 2 : 390. *Kalanchoe pinnata* (Lam.) Pers. Syn. 1 : 446 (1805).
S.L.: Regent (May) *Barter* ! Hill Station (Dec.) *Deighton* 482 ! **Lib.**: Monrovia *Whyte* ! **Iv.C.**: *fide* Chev. *l.c.* **G.C.**: Aburi (Jan.) *Johnson* 890 ! Bushua beach (Apr.) *Chipp* 182 ! **Togo**: Lome *Warnecke* 38 ! **Dah.**: Dogba *Chev.* 23290. **S.Nig.**: Idanre (Jan.) *Brenan & Keay* 8740 ! Oban *Talbot* 1510 ! Native of Madagascar ; introduced to and now naturalized in many parts of tropical Africa, and also in Asia and S. America. (See Appendix, p. 28.)

3. **KALANCHOE** Adans.—F.T.A. 2 : 390.

Stems, pedicels and calyx quite glabrous ; calyx divided to the base, segments linear-lanceolate, acutely acuminate ; corolla lobes ovate-lanceolate, acute ; leaves distinctly petiolate, lamina more or less elliptic (in our area), margin doubly crenate 1. *laciniata*
Stems, pedicels or calyx pubescent or glandular-pilose :

Leaves distinctly petiolate ; connate portion of the calyx as long or almost as long as the lobes ; inflorescence more or less densely glandular-pilose ; stems not angular 2. *crenata*

Leaves sessile ; connate portion of the calyx much shorter than the lobes ; inflorescence sparingly pilose ; stems more or less quadrangular .. .. 3. *lanceolata*

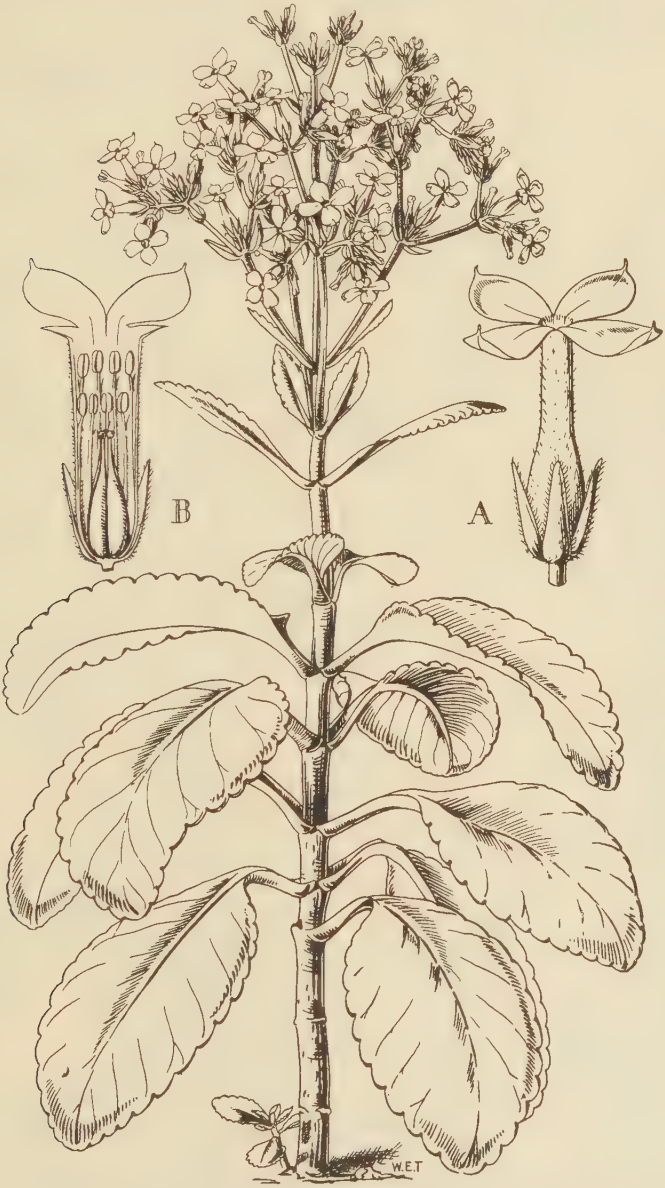

FIG. 39.—KALANCHOE CRENATA (*Andr.*) *Haw.* (CRASSULACEAE).

A, flower. B, the same in longitudinal section showing all the stamens.

1. **K. laciniata** (*Linn.*) *DC.* Pl. Succ. Hist. t. 100 (1802) ; R. Hamet in Bull. Herb. Boiss. Sér. 2, 7 : 897 (1907) ; Berger in E. & P. Pflanzenfam. 18A : 406 (1930). *Cotyledon laciniata* Linn. Sp. Pl. 430 (1753). *K. crenata* of F.T.A. 2 : 394, partly. *K. petitiana* of F.W.T.A., ed. 1, 1 : 105 ; Chev. Fl. Viv. 1 : 281. Herb, to 6 ft. high ; flowers yellow, orange, or magenta.
S.Nig.: Oban *Talbot*! Balleghete (Jan.) *Rosevear* 13/30! **Br.Cam.:** Cam. Mt., 3,000–7,600 ft. (Dec., Jan.) *Mann* 1315! 2038! *Maitland* 962! Mba Kokeka Mt., 7,500 ft. (Jan.) *Keay* FHI 28401! Widespread in the tropics.

2. **K. crenata** (*Andr.*) *Haw.* Syn. Pl. Succ. 109 (1812); Berger l.c. 406; F.T.A. 2: 394, partly; Chev. Fl. Viv. 1: 279. *Vereia crenata* Andr. Bot. Repos. 1, t. 21 (1798). *K. afzeliana* Britten in F.T.A. 2: 393. *K. coccinea* Welw.—F.W.T.A., ed. 1, 1: 105. Fleshy herb, to 6 ft. high; flowers yellow to red.
Fr.Sud.: Gourma (July) *Chev.* 24425. **Fr.G.:** Follo (Dec.) *Chev.* 14823. Mamou (Jan.) *Chev.* 20358. **S.L.:** Leicester Peak (Dec.) *Sc. Elliot* 3883! Bintumane Peak (Jan.) *T. S. Jones* 66! **Iv.C.:** Bingerville (Dec.) *Chev.* 16565. **G.C.:** Aburi (May) *Johnson* 31! Ofako, Achimota (Jan.) *Irvine* 1966! **Dah.:** Porto Novo (Feb.) *Chev.* 22908! **N.Nig.:** Bauchi Plateau *Dent Young* 90! *W. D. MacGregor* 401! *Batten-Poole* 233! **S.Nig.:** Lagos *Rowland*! *Dalz.* 1355! **Br.Cam.:** Mopanya *Kalbreyer* 158! Buea (Feb.) *Maitland* 997! Bamenda (Jan.) *Migeod* 435! Also in French Cameroons and S. Tomé.

3. **K. lanceolata** (*Forsk.*) *Pers.* Syn. 1: 446 (1805); R. Hamet in Bull. Herb. Boiss. Sér. 2, 8: 32 (1908); Berger l.c. 406; Chev. Fl. Viv. 1: 280. *Cotyledon lanceolata* Forsk. Fl. Aegypt.-Arab. 89 (1775). *K. glandulosa* Hochst.—F.T.A. 2: 396. A herb, to 4 ft. high, amongst rocks; flowers yellow to salmon-pink.
Fr.Sud.: Balani (Jan.) *Chev.* 149. **G.C.:** Shai Hills (Jan.) *Irvine* 646! **N.Nig.:** Naraguta (Nov.) *Lely* 700! Widespread in tropical Africa.

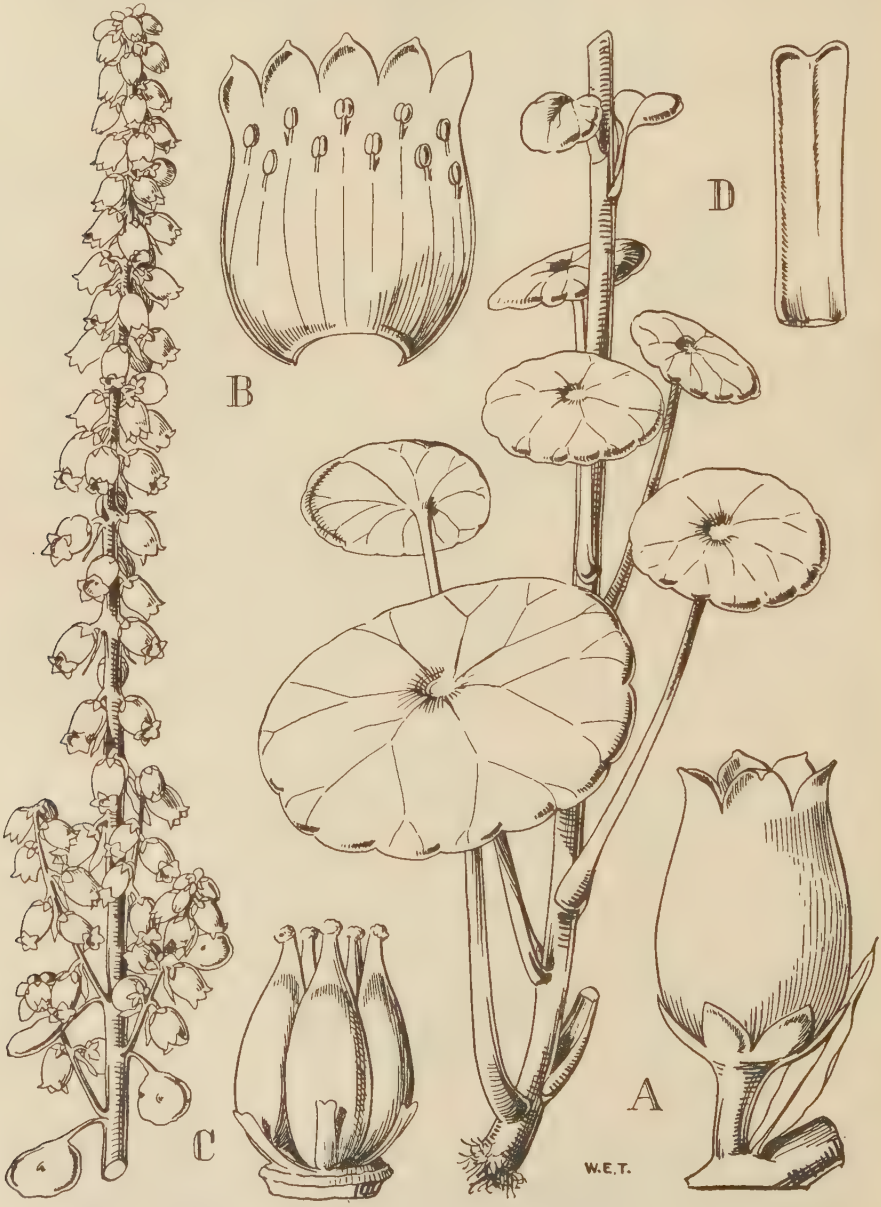

Fig. 40.—Umbilicus botryoides *Hochst. ex A. Rich.* (Crassulaceae).
A, flower. B, corolla laid open. C, carpels and hypogynous scales. D, one of the scales.

4. **UMBILICUS** DC.—F.T.A. 2 : 398, under *Cotyledon* Linn.

An erect, simple or slightly branched, glabrous fleshy herb, up to about 30 cm. high; lower leaves peltate, long-petiolate, orbicular, slightly crenate, 3–4 cm. in diameter, the upper ones more or less basifixed and more shortly petiolate ; bracts often foliaceous and then larger than the flowers ; pedicels about 3 mm. long ; sepals ovate-triangular, acute, about 2 mm. long ; corolla ellipsoid, about 7 mm. long *botryoides*

U. botryoides *Hochst. ex A. Rich.* Tent. Fl. Abyss. 1 : 308 (1848). *Cotyledon umbilicus* of F.T.A. 2 : 398, not of Linn.

Br.Cam.: Cam. Mt., 7,000–10,000 ft. (Nov.-Jan.) *Mann* 1286! 2035! Also on the mountains of eastern Africa from Somaliland to Tanganyika.

Formerly identified with the western European *U. pendulinus* DC., but differing in its shorter pedicels, short and broad sepals and more globular corolla.

25. SAXIFRAGACEAE

Herbs, not or slightly succulent. Leaves usually alternate (opposite in *Vahlia*), exstipulate. Flowers actinomorphic, hermaphrodite, rarely solitary. Sepals usually 5, imbricate or valvate. Petals alternate with the sepals or

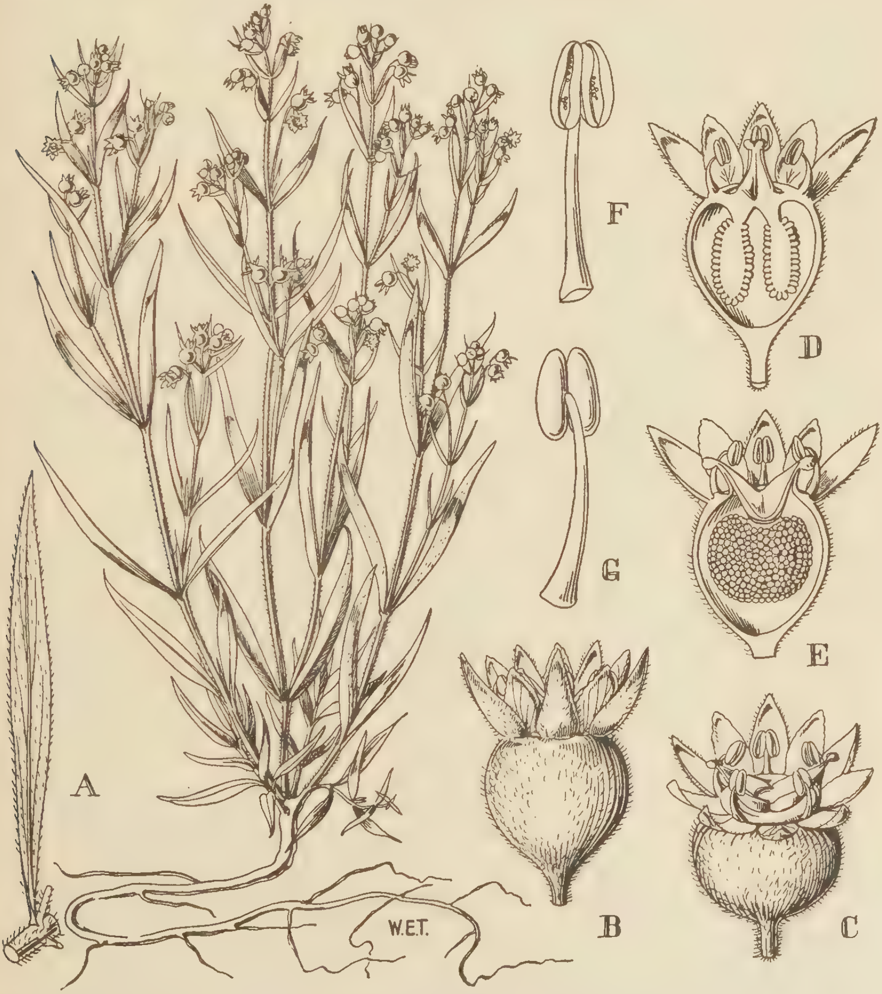

Fig. 41.—Vahlia dichotoma (*Murr.*) *O. Ktze.* (Saxifragaceae).

A, leaf. B, flower. C, the same open. D, longitudinal section of flower showing pendulous placentas. E, the same showing the face of a placenta. F, stamen. G, the same from behind.

absent, often clawed, perigynous or rarely epigynous. Stamens inserted with the petals, 5–10 ; filaments free ; anthers 2-celled, dehiscing longitudinally. Ovary 1–5-celled, free or adnate to the receptacle ; styles usually free ; ovules numerous, on axile or parietal placentas or the latter pendulous from the apex of the cells. Fruit a capsule. Seeds usually numerous, small, with endosperm ; embryo minute, straight.

Widely distributed in temperate regions, rare in the tropics. Represented in our area by the single genus *Vahlia*, which is remarkable in the family in having opposite leaves and the placentas pendulous from the top of the ovary. This genus is liable to be mistaken for *Oldenlandia* (*Rubiaceae*), which has interpetiolar stipules, united petals and axile placentas.

VAHLIA Thunb.—F.T.A. 2 : 383.

Herbs with opposite exstipulate ovate to linear leaves, often glandular. Flowers paired, axillary, subsessile or pedunculate. Sepals 5, valvate. Petals 5, scarcely exceeding the sepals. Stamens 5. Ovary inferior, 1-celled, with 2 pendulous many-ovuled placentas. Capsule dehiscing at the apex.

Plant very viscous with gland-tipped hairs ; leaves ovate or ovate-lanceolate, rarely linear-lanceolate ; flowers subsessile, in axillary pairs or solitary ; calyx-lobes ovate, about as long as the tube ; filaments filiform, ciliate, with a small hairy appendage at the base ; styles as long as the calyx-lobes .. .. 1. *digyna*

Plant not or slightly viscous ; leaves linear ; flowers paired on axillary peduncles ; calyx-lobes lanceolate or ovate-lanceolate, shorter than the tube at least in fruit ; filaments about twice as long as the anthers, not ciliate and not appendaged ; styles rather short, stout and divaricate .. .. 2. *dichotoma*

1. **V. digyna**(*Retz.*) *O. Ktze.* in Rev. Gen. Pl. 1 : 227 (1891) ; F.W.T.A., ed. 1, 2 : 605. *Oldenlandia digyna* Retz. Obs. 4 : 23 (1786). *V. viscosa* Roxb. Fl. Ind. 2 : 89 (1832) ; F.T.A. 2 : 383 ; F.W.T.A., ed 1, 1 : 106 ; Chev. Fl. Viv. 1 : 284. *V. ramosissima* A. DC. in DC. Prod. 4 : 54 (1830). *V. silenoides* A. DC. l.c. ; Chev. Fl. Viv. 1 : 284. Much-branched herb to 1 ft. high, in sandy river beds and swampy meadows ; petals yellow.
Sen.: Walo (Oct.) *Perrottet* ! **Fr.Sud.** & **Fr.Nig.:** *fide* Chev. *l.c.* **N.Nig.:** Sokoto (Dec.) *Moiser* 189 ! Yola (Dec.) *Dalz.* 50 ! Kukawa (Jan.) *E. Vogel* 5 ! Extends eastwards to India.

2. **V. dichotoma** (*Murr.*) *O. Ktze.* l.c. (1891). *Heuchera dichotoma* Murr. in Comm. Gott. 3 : 64, t. 1 (1773). *V. oldenlandioides* Roxb. l.c. (1832) ; F.T.A. 2 : 384 ; F.W.T.A., ed. 1, 1 : 106 ; Chev. Fl. Viv. 1 : 283. *V. tomentosa* A. DC. l.c. 4 : 54 (1830). Much-branched herb in damp fields, etc. ; much resembling an *Oldenlandia*. Petals yellow, fading to white or pink.
Sen.: Walo (Oct.) *Perrottet* ! St. Mary Isl. *Brunner* 145 ! Dakar *Rattray* ! **Fr.Sud.:** Timbuktu (July) *Hagerup* 164 ! And several other localities *fide* Chev. *l.c.* **Togo:** Lome *Warnecke* 153 ! **Fr.Nig.:** Zinder *Hagerup* 614 ! **N.Nig.:** Borgu *Barter* 725 ! Sokoto (Oct., Nov.) *Dalz.* 441 ! *Moiser* 234 ! 239 ! 243 ! Takwara, Bauchi Plateau (May) *Lely* 106 ! Bornu (Jan., Apr.) *E. Vogel* 81 ! *Daggash* FHI 24966 ! Widespread in dry regions of tropical Africa and Asia.

26. DROSERACEAE

Herbs, often stemless with rosettes of leaves, the latter usually covered with sticky stipitate glands which entrap insects. Flowers actinomorphic, hermaphrodite, in usually simple circinate cymes. Sepals 5–4, more or less connate at the base, imbricate, persistent. Petals 5, hypogynous, very rarely perigynous, nervose. Stamens 4–20, often 5, hypogynous, free or rarely united at the base ; anthers 2-celled, extrorse, opening by longitudinal slits. Ovary free, 1-celled, with parietal or subbasal placentas ; ovules many or rarely few ; styles 3–5, mostly free. Fruit a loculicidal capsule. Seeds numerous, with fleshy endosperm; embryo straight ; cotyledons short.

A small family generally found in swampy or sandy situations in tropical and temperate regions of both hemispheres ; not found in rain-forest areas. Easily recognized by the herbaceous habit and the stipitate-glandular leaves which entrap insects, the smallish fugacious flowers, and the syncarpous ovary with parietal placentas.

DROSERA Linn.—F.T.A. 2 : 401 ; Diels in Engl. Pflanzenr. Droserac. (1906).

Herbs with sticky glandular hairs. Sepals and petals 5 (rarely 4–8). Stamens the same number as the petals, and alternating with them. Placentas 3–5.

Leaves spathulate ; pedicels up to 3 mm. long :

Leaves evenly spaced along the elongated (up to 15 cm.) stem ; leaves with definite petiole 1·5–3 cm. long, lamina about 2 cm. long and 3–5 mm. broad, old leaves deflexed ; stipules broad, pectinate, persistent, scarious ; inflorescences 10–30 cm. long ; seeds fusiform .. .. 1. *madagascariensis*

Leaves in a close whorl on the very short stem ; leaves attenuate at the base into the rather flattened petiole, generally rather shorter than above, with relatively broad lamina ; stipules small, not conspicuous ; inflorescences 5–15 cm. long ; seeds minute, ovoid .. .. 2. *burkeana*

Leaves linear ; pedicels 6–10 mm. long ; stems elongated with the leaves evenly spaced, deflexed when old ; leaves 2–10 cm. long and 3–4 mm. broad ; stipules setiform or obsolete .. .. 3. *indica*

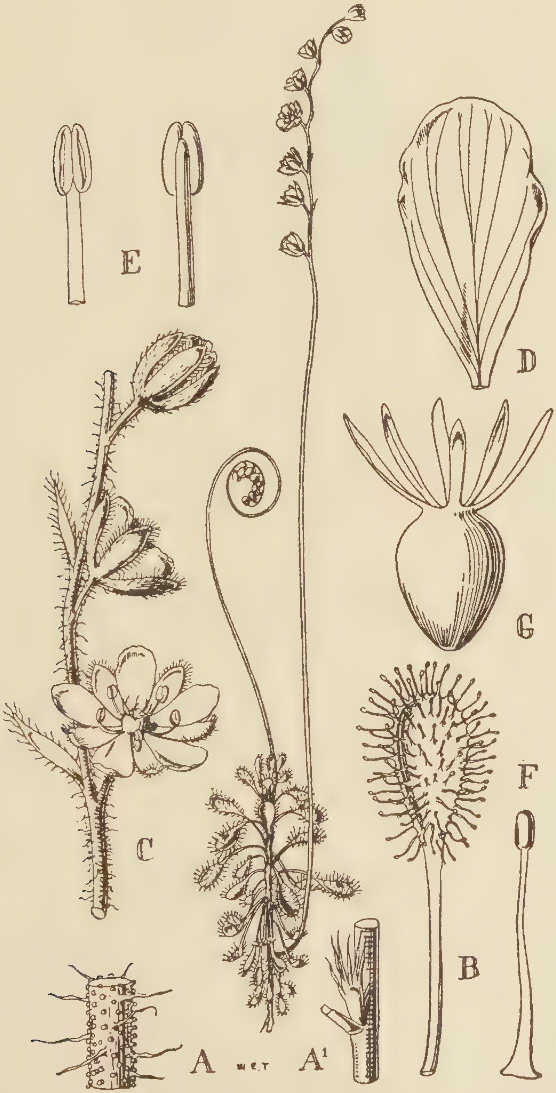

Fig. 42.—Drosera madagascariensis *DC.* (Droseraceae).

A, portion of stem. A1, stipule. B, leaf. C, portion of raceme enlarged. D, petal. E, stamen, front and back. F, gland-tipped hair of leaf. G, fruit.

1. **D. madagascariensis** *DC.* Prod. 1 : 318 (1824) ; Diels in Engl. Pflanzenr. Droserac. 98 ; Chev. Fl. Viv. 1 : 287. *D. ramentacea* of F.T.A. 2 : 403, not of Burch. Flowers pink.
Fr.Sud.: Sikasso (May) *Chev.* 788. Folo (May) *Chev.* 842. **Fr.G.:** Labé *Pobéguin* 2084. **N.Nig.:** Nupe *Barter* 1332! Kontagora (Nov.) *Dalz.* 63! Vom *Dent Young* 89! **Br.Cam.:** Banso, Bamenda, 6,000 ft. (Jan.) *Keay* FHI 28450! Widespread in tropical Africa, S. Africa and Madagascar.

2. **D. burkeana** *Planch.*—F.T.A. 2 : 402 ; Diels l.c. 88. Flowers pink ; in grassland.
Br.Cam.: Bum, Bamenda, 4,000 ft. (May) *Maitland* 1499! Nchan, 5,000 ft. (May) *Maitland* 1499 *bis*! Widespread in east and south tropical Africa, and in S. Africa.

3. **D. indica** *Linn.*—F.T.A. 2 : 402 ; Diels .c. 77 ; Chev. Fl. Viv. 1 : 286. Flowers pink, mauve or white ; the commonest species in W. Africa.
Sen.: Casamance (Jan., Feb.) *Chev.* 3145 ; 3146. **Gam.**: *Brown-Lester* 38! **Fr.Sud.**: Koulikoro (Oct.) *Chev.* 3148! **Fr.G.**: Kindia (Dec.) *Pobéguin* 1316! **S.L.**: Waterloo (Oct.) *Lane-Poole* 401! Brookfields (Oct.) *Deighton* 147! **Lib.**: Monrovia *Baldwin* 9197! **Iv.C.**: Baoulé *Chev.* 22390. Mankono *Chev.* 21862. **G.C.**: Navrongo (Oct.) *Vigne* 4605! **N.Nig.**: Nupe *Barter* 1331! Zungeru (Sept.) *Dalz.* 62! Zaria, Anara F.R. (Oct.) *Keay* FHI 5499! Bauchi Plateau (July, Aug.) *Lely* 531! P. 595! Widespread in tropical Africa, Asia and Australia.

27. PODOSTEMACEAE

By G. Taylor

Aquatic herbs of rocks or stones in swift-flowing water or spray of waterfalls. Plant-body often reduced to a thallus usually attached to the substratum by haptera. Shoots (when present) arising from a thalloid base and bearing simple or deeply divided, alternate, exstipulate or minutely stipulate leaves. Flowers solitary or cymose, bracteate, hypogynous, zygomorphic. Perianth 3-phyllous or rudimentary and then usually of 2 minute more or less subulate tepals in which case the flower is enclosed (and often inverted) within a spathaceous bract (*spathella*) which ruptures irregularly on emergence of the flower. Stamens 1–2 (rarely 3 or 4), filaments free or connate at the base ; anthers 4-locular, opening lengthwise ; staminode inserted between 2 stamens in *Stonesia* ; pollen-grains solitary or geminate. Ovary sessile or shortly stipitate, of 2–3 united carpels, 1–3-locular ; stigmas 1–3 ; ovules numerous on axile placentas. Fruit a septicidal capsule. Seeds minute, exalbuminous.

Predominantly tropical ; a few species in warm north temperate region. A remarkable family on account of the unusual habitat with attendant modification in vegetative and floral morphology, the species commonly resembling mosses, hepatics or algae.

Perianth of 3 equal or subequal tepals ; spathella absent ; stamen 1 ; styles 3 ; capsule opening by 3 valves .. .. 1. **Tristicha**
Perianth reduced to 2 minute tepals ; flower enclosed in a tough (rarely membranous) spathella which ruptures irregularly at anthesis ; stamens usually 1 or 2 (very rarely 3 or 4) ; styles 2 ; capsule opening by 2 valves :
  Flower erect within the unruptured spathella with the pedicel shorter than the gynoecium :
    Capsule ellipsoid, ribbed :
      Caulescent herbs with stems and leaves dichotomously branched ; stigmas subulate 2. **Pohliella**
      Acaulous herb with a ribbon-like branched thallus bearing small 1-flowered shoots along each margin ; leaves rosulate, simple, subulate ; stigmas complanate, elliptic in outline .. .. 3. **Butumia**
    Capsule globose, smooth and unribbed .. .. 4. **Letestuella**
  Flower inverted within the unruptured spathella with the pedicel at least as long as the gynoecium :
    Stamens 2, with an interposed subulate staminode ; capsule ribs 12–18, those nearest the commissures shortest and not extending throughout the length of the capsule 5. **Stonesia**
    Stamens usually 2, sometimes 1 and very rarely 3 or 4 ; staminode absent ; capsule 8–10-ribbed, including the double commissural ribs, all ribs running the length of the capsule .. .. 6. **Inversodicraea**

1. **TRISTICHA** Thouars—F.T.A. 6, 1 : 121 ; Engl. in E. & P. Pflanzenfam. 18A : 35 (1930).

A polymorphic herb varying considerably according to habitat and season, with a linear branched thallus closely attached to the substratum, bearing usually small leafy moss-like shoots but the leafy shoots varying greatly in size from about 3 mm. to occasionally over 30 cm. in length ; leafy shoots bearing rows (tristichous) of closely set imbricate to more or less distantly arranged leaves ; leaves sessile, ovate to narrowly lanceolate at apex, entire at margin, up to 1 mm. in length, membranous, (often obscurely) 1-veined, sometimes prominently keeled ; flowers terminal on leafy branchlets, often clustered, pedicels slender, rigid and wiry, up to 1·5 cm. in length ; perianth of 3 equal usually more or less connate 1-nerved tepals ; stamen 1, filament filiform, anther lobes contiguous, pollen grains 1-celled, trisulcate ; ovary 3-locular, styles 3, erect or spreading ; ovary 3-celled with many ovules ; capsule ellipsoid, 3-valved, valves conspicuously 3-ribbed .. .. *trifaria*

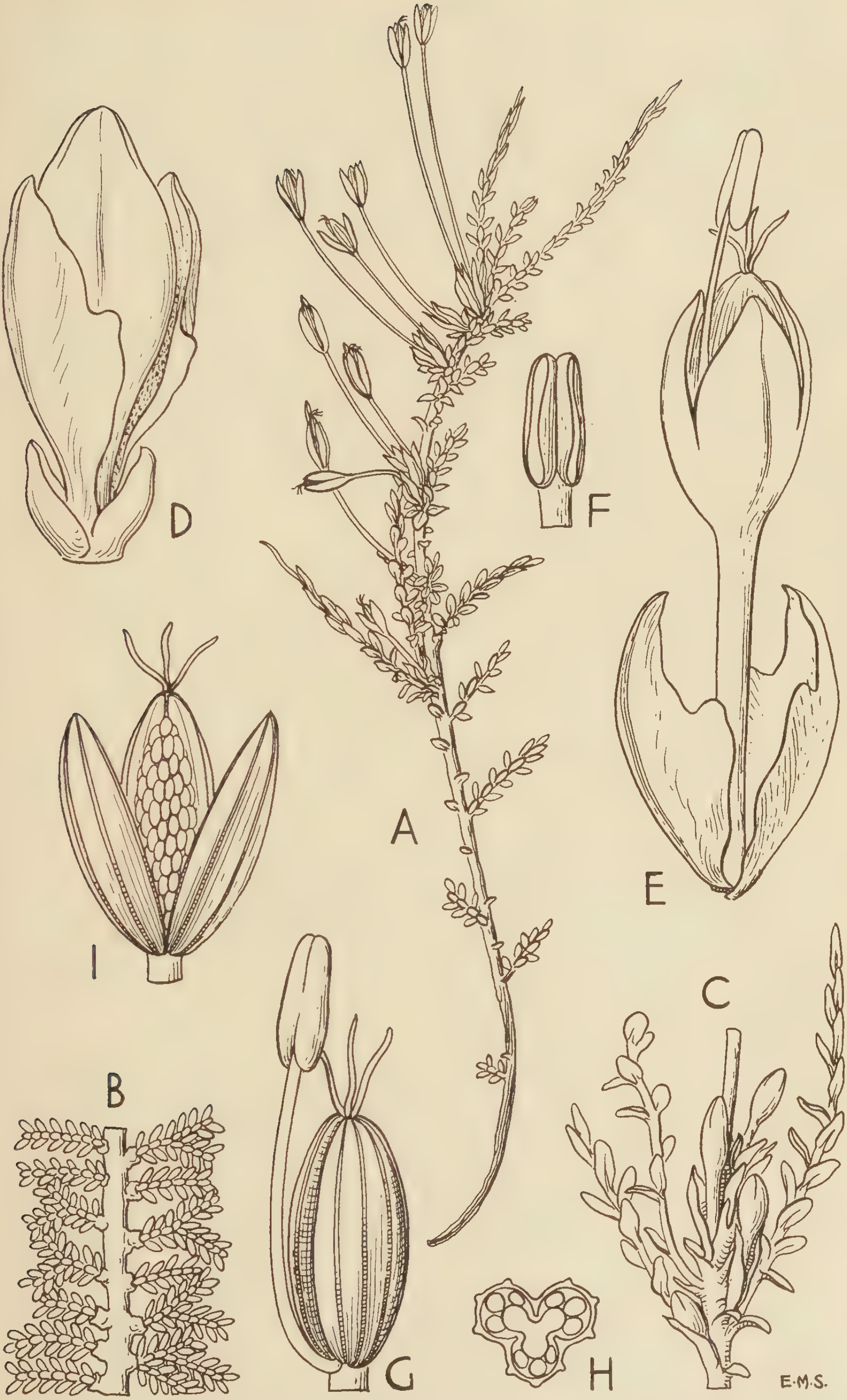

FIG. 43.—TRISTICHA TRIFARIA (*Bory*) *Spreng.* (PODOSTEMACEAE).

A, branched flowering shoot, × 3. B, portion of branched basal stem, × 3. C, portion of flowering shoot, × 6. D, flower bud, × 24. E, mature flower with bracts at base of pedicel, × 18. F, anther, × 24. G, flower with perianth removed, × 24. H, cross section of ovary (diagrammatic). I, dehisced capsule, × 24.

T. trifaria (*Bory*) *Spreng.* Syst. 1 : 22 (1825). *Dufourea trifaria* Bory. *T. hypnoides* (St.-Hil.) Spreng.—F.T.A. 6, 1 : 121 ; Chev. Bot. 539 ; F.W.T.A., ed. 1, 1 : 108 ; Chev. Fl. Viv. 1 : 290, t. 43C. *T. alternifolia* (Willd.) Thouars—Chev. Fl. Viv. 1 : 291.
Fr.Sud.: Chutes de Billy (Dec.) *Chev.* 65 ! R. Senegal *Chev.* 26018. R. Baoulé *Chev.* 682. **Fr.G.:** R. Grande *Pobéguin* 1994. **S.L.:** R. Scarcies, Kambia, Magbema (Dec.) *Jordan* 753 ! **Lib.:** Piatah, St. Paul R. (Dec.) *Baldwin* 10601 ! **Iv.C.:** R. Alépé *Chev.* 17516. **G.C.:** R. Butre, Sekondi (Jan.) *Box* 2100 ! R. Volta, Nangodi (Dec.) *Adams & Akpabla* 4287 ! **Fr.Nig.:** R. Niger *De Wailly* 5031. **N.Nig.:** near Ketsa, Nupe *Barter* 1093 ! R. Awon, 5 miles from R. Niger *Barter* 1530 ! Abuja (Jan.) *Savory* UCI 149 ! Randa *Hepburn* ! **S.Nig.:** R. Ogun (June) *Ross* 303 ! Bebi, R. Ata, Obudu (Jan.) *Keay & Savory* FHI 25280 ! 25282 ! 25283 ! R. Oshin, Ilorin-Jebba Road (Dec.) *Meikle* 685 ! **Br.Cam.:** Botanic Gardens, Victoria (Nov.) *Rosevear* 131/36 ! Victoria, R. Joke (Mar.) *Brenan* 9495 ! R. Metschum, Bamenda, above falls (Jan.) *Keay* FHI 28537 ! 28538 ! 28539 ! R. Metschum, below falls (Jan.) *Keay* FHI 28540 ! **F.Po:** *Mann* ! Near Clarence *Barter* 2073 ! The most widespread species in the family. Widely distributed in tropical Africa, Madagascar and the Mascarene Islands ; also in India and in the West Indies, central and tropical S. America.

2. POHLIELLA Engl. Bot. Jahrb. 60 : 457 (1926).

A caulescent herb up to 21 cm. high, attached to rocks by a thallus-like base ; stems branching ; slightly compressed ; floating leaves flabellate in outline, much-branched dichotomously with the ultimate segments capillary, up to 3 cm. long and 2 cm. broad, vaginate at the base ; spathellae borne on the thallus and also axillary towards the apex of flowering branches, narrowly ellipsoid, about 1 mm. long ; flower erect within the spathella ; stamen 1, filament ultimately 4·5 mm. long, anther 0·5–0·75 mm. long and 3·5 mm. broad ; capsule ellipsoid, about 3·5 mm. long, valves equal, 3-ribbed apart from the marginal ribs .. .. *flabellata*

P. flabellata *G. Tayl.* in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 53 (1953). Forming dense masses on rocks below water.
S.Nig.: R. Afi, on Aboabam-Boje path (Dec.) *Keay* FHI 28240 !

3. BUTUMIA G. Tayl. in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 55 (1953).

An acaulous plant with a branched ribbon-like thallus ; dwarf 1-flowered shoots arising along each margin of the thallus ; leaves rosulate, sessile, subulate, slightly amplexicaul at the base, inner leaves subtending the flower minutely stipulate ; flower erect within the spathella on short pedicel ; stamen 1, filament ultimately about 1·2 mm. long, anther about 0·5 mm. long ; ovary ellipsoid, about 3·5 mm. long ; stigmas subulate-filiform, about 2 mm. long ; capsule ellipsoid, about 3·5 mm. long, valves equal, 3-ribbed apart from the marginal ribs .. .. *marginalis*

B. marginalis *G. Tayl.* in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 55, t. 2 (1953). Moss-like plant on smooth granite rocks in fast-flowing stream.
S.Nig.: R. Butum, Utanga, 2 miles north of Bagga, Obudu (Dec.) *Keay, Savory & Russell* FHI 25152 !

4. LETESTUELLA G. Tayl. in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 57 (1953).

A slender branched herb up to 3·5 cm. high, probably with a thalloid base ; leaves narrowly linear, entire or shortly bifid, up to 2 cm. long, vaginate at the base ; spathella borne at the ends of branches, with stalk up to 1 cm. ; stamens 2, filaments and andropodium together about 1·5 mm. long ; pedicel of infructescence about 1 cm. long ; capsule globose, smooth and shining, valves equal and unribbed *chevalieri*

L. chevalieri *G. Tayl.* in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 59 (1953). *Leiothylax sphaerocarpa* of Chev. Fl. Viv. 1 : 295, partly (excl. spec. Cameroons), not of Engl.
Fr.Sud.: falls of the Niger (Mar.) *Chev.* 44058 *bis.*

5. STONESIA G. Tayl. in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 59 (1953).

Spathellae borne singly on the thallus and axillary on branched stems, or singly along almost efoliate stems ; stigmas filiform, at least 0·3 mm. long :
Spathellae monomorphic, ellipsoid both on the thallus and stems, those on the stems more or less closely arranged (singly or 2 to 3 at the nodes) along the lower parts of the stems ; stems simple or sparingly branched towards the apex .. 1. *gracilis*
Spathellae dimorphic, those on the thallus compressed with a ring-like cartilaginous margin, those on the much-branched stems involucellate 2. *heterospathella*
Spathellae in nodal clusters towards the base of the stems ; stigmas short, about 0·1 mm. long .. .. 3. *fascicularis*

1. **S. gracilis** *G. Tayl.* in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 65, t. 7 (1953). Caulescent herb up to 22 cm. long ; stems arising from a thalloid base, slender, simple or occasionally sparingly branched towards the apex ; leaves deciduous and at time of flowering only persisting towards the apices of the stems; spathellae about 2 mm. long ; flowers within the spathellae about 1·8 mm. long ; pedicel about 1·8 mm., ultimately up to 4 mm. long ; tepals 0·8 mm. long ; filaments 0·5 mm. long ; anthers 0·75 mm. long ; staminode 0·5 mm. long ; andropodium within the spathella about 0·5 mm. but ultimately up to 1 mm. long ; ovary 1 mm. long ; stigmas about 0·3 mm. long ; capsule 14-ribbed, each valve 7-ribbed, the persistent valve slightly inrolled.
Fr.G.: Great Falls, Kindia (Nov.) *Abbayes* 355/1951 !
2. **S. heterospathella** *G. Tayl.* l.c. 60, t. 5 (1953). *Dicraeia garrettii* of Chev. Bot. 539 ; F.W.T.A., ed. 1, 1 : 108, partly (Fr.G. spec.). *Dicraeanthus parmelioides* A. Chev. Fl. Viv. 1 : 294, t. 43B (1938), French descr. only. Caulescent herb up to 12 cm. long ; stems arising from a thalloid base, elongate and dichotomously branched ; leaves laciniate, the upper segments with the small persistent bases of deciduous laciniae ; spathellae about 2 mm. long ; flower within the spathella 1·5 mm. long ; pedicel 1·5 mm. ultimately up

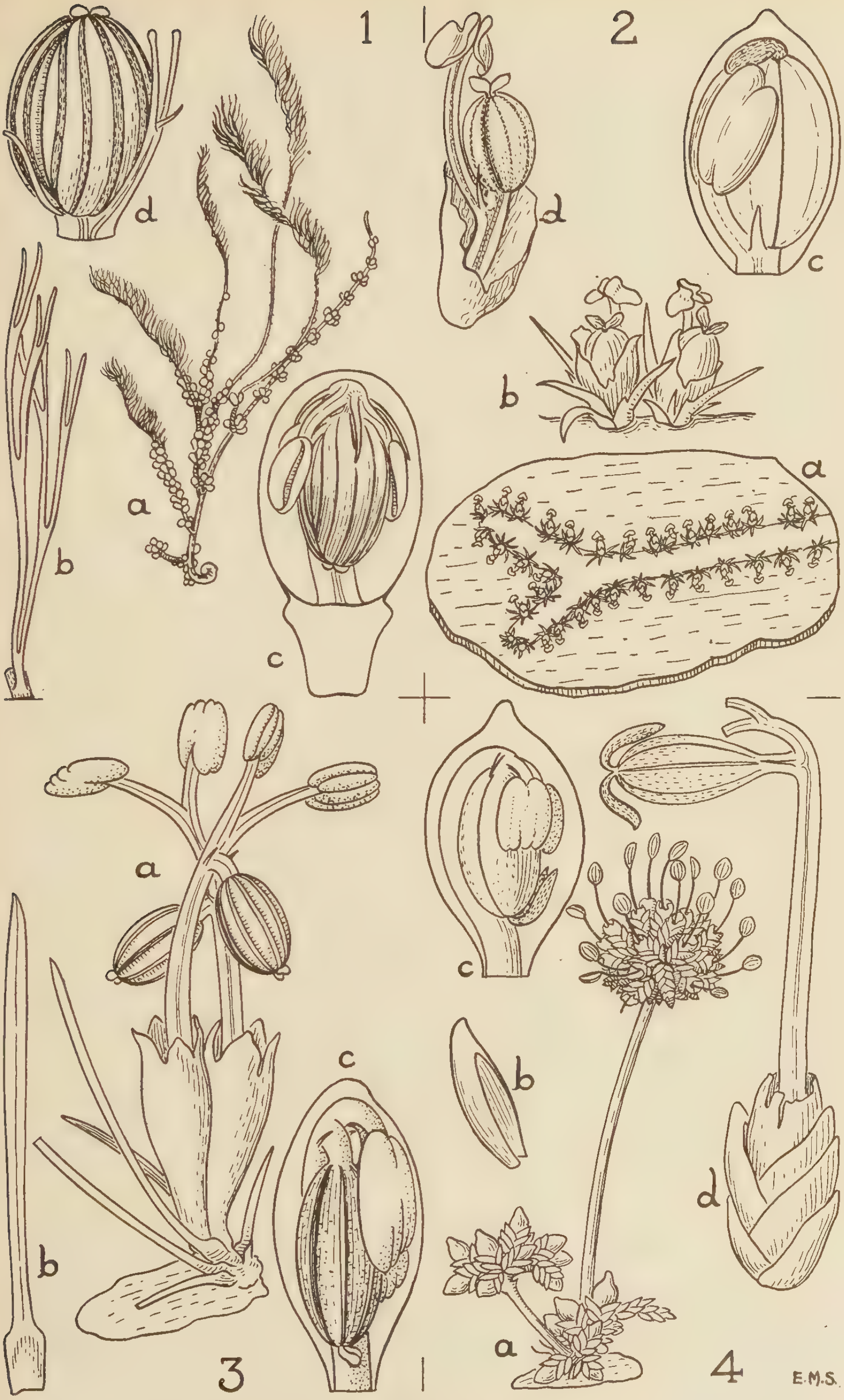

Fig. 44.—Podostemaceae.

1. *Stonesia fascicularis* G. Tayl.—a, plant showing habit, × ½ ; b, leaf, × 4 ; c, flower within unruptured spathella, × 16 ; d, young fruit with persistent tepals and androecium, × 24.
2. *Butumia marginalis* G. Tayl.—a, habit on rock, × 2 ; b, flowers on margin of thallus, × 10 ; c, flower within unruptured spathella, × 28 ; d, mature flower, × 14.
3. *Inversodicraea tenuifolia* G. Tayl.—a, flowering shoot, × 10 ; b, leaf, × 15 ; c, flower within unruptured spathella, × 16.
4. *Inversodicraea keayi* G. Tayl.—a, plant showing habit, × 2 ; b, leaf, × 16 ; c, flower within unruptured spathella, × 16 ; d, flowering shoot at maturity, × 16.

to 4 mm. long ; tepals 0·5 mm. long ; filaments 0·3 mm. long ; anthers 0·4 mm. long ; staminode 0·3 mm. long ; andropodium very short ; ovary 1 mm. long ; stigmas 0·5 mm. long ; capsule subglobose or ellipsoid, 12–18-ribbed, each valve 6–8-ribbed, the persistent valve strongly inrolled.

Fr.G.: Ditinn to Diaguissa (Apr.) *Chev.* 12842 ! Great Falls (Dec.) *Chev.* 20231. Great Falls, Ditinn (Nov.) *Abbayes* 877/1948 ! 887/1948 ! Falls of R. Kinkon, Pita (Nov.) *Abbayes* 897 *bis*/1948 !

3. **S. fascicularis** *G. Tayl.* l.c. 65, t. 6 (1953). Caulescent herb up to 36 cm. long ; stems elongated, branched towards the base ; leaves up to 15 mm. long, 2–3-bifid ; spathellae about 2 mm. long ; flower in the spathella about 1·5 mm. long ; pedicel about 2 mm. ultimately up to 5 mm. long ; tepals 0·6 mm. long ; filaments 0·6 mm. long ; anthers 0·75 mm. long ; staminode about 0·5 mm. long ; ovary 1·25 mm. long ; stigmas about 0·1 mm. long ; capsule 14-ribbed ; each valve 7-ribbed, the persistent valve slightly inrolled.

Fr.G.: falls of R. Kinkon, Pita (Nov.) *Abbayes* 897/1948 !

6. INVERSODICRAEA Engl. Pflanzenw. Afr. 3, 1 : 271–275 (1915) ; E. & P. Pflanzenfam. 18A : 53 (1930).

Leaves rosulate or polystichous, or deciduous and plant appearing leafless in the fruiting stage :

Leaves polystichous, sometimes linear and 1–2-bifid, but mostly small, scale-like, cartilaginous and variously lobed or toothed, closely crowded towards the apex of the branches, or deciduous and the plants apparently leafless at maturity ; stems usually much-branched, rarely subacaulous and then plants not reaching 2 cm. in height :

Plants at maturity more than 2 cm. high ; stems repeatedly branched and bare or with scattered scale-like leaves on the lower parts of the plant :

Branching stems, slender and only slightly compressed and almost leafless below except for a few scattered hair-like bristles ; tips of the flowering shoots swollen and strobiliform with closely aggregated linear or linear-lanceolate scale-like entire or 3-dentate leaves surrounding the developing spathellae and also with finely and repeatedly dichotomously divided capillary leaves . . 1. *abbayesii*

Branching stems rather stout, often compressed and with scattered scale-like (not bristle-like) leaves ; tips of the flowering branches not noticeably swollen ; upper leaves broad scale-like, commonly 3-toothed, sometimes with a few 1–3-bifid leaves with linear segments:

Stems strongly compressed, spathellae clustered on the tip of the branches, which are often leafless :

Stamens 2 ; capsule slightly compressed . . . . . . 2. *garrettii*

Stamen 1 ; capsule cylindrical . . . . 3. *macrothyrsa*

Stems at most slightly compressed ; spathellae 1–3 at or towards the tips of the foliose branches :

Loosely branched herb up to 13 cm. high with the lower parts of the branches smooth or bearing sparse scale-like leaves ; spathellae up to 6 mm. long ; fruiting pedicels 2 cm. long ; capsule 3 mm. long . . . . 4. *adamesii*

Closely branched herb 3–4 cm. high with the lower parts of the stems somewhat ridged or corrugated with scale-like leaves or persistent bases of leaves ; spathellae about 1·5 cm. long ; fruiting pedicel 1·5 mm. long ; capsule 2 mm. long . . . . 5. *ledermannii*

Plants at maturity dwarf, usually less than 1 cm. and not exceeding 2 cm. ; leaves closely imbricated throughout the length of the stem . . . . 6. *pygmaea*

Leaves rosulate, linear-subulate, persistent ; dwarf, subacaulous, unbranched herb with 1–3-flowered shoots arising from a flat thallus . . . . 7. *tenuifolia*

Leaves distichous and some at least persisting to the fruiting stage :

Leaves linear and entire or 1–2-bifid with narrow segments, up to 1·5 cm. long :

Branched herb up to 3 cm. high ; leaves linear, entire ; stamens 2 ; stigmas botuliform, 1 mm. long . . . . 8. *musciformis*

Unbranched herb, or obscurely branched at the flowering apices, not exceeding 1 cm. in height ; leaves 1–2-bifid ; stamens (1–) 2 (–4) ; stigmas very short, clavate or flabellate and then lobed . . . . 9. *variabilis*

Leaves cymbiform, up to 2 mm. long :

Dwarf acaulous herb not exceeding 1 cm. in height ; stigmas very short 10. *aloides*

Caulescent herb up to 6 cm. high ; stem unbranched and naked below ; dwarf flowering shoots with closely imbricated leaves, congested into heads or fascicles 11. *keayi*

1. **I. abbayesii** *G. Tayl.* in Bull. Brit. Mus. (Nat. Hist.), Bot. Ser. 1 : 67, t. 8 (1953). Branched herb up to 30 cm. ; scale-like leaves 0·5–1 mm. long, branched capillary leaves up to 3·5 cm. long ; spathellae up to 3 mm. long ; pedicel in spathella 2·75 mm. (eventually up to 7·5 mm.) long ; tepals 0·8 mm. long ; filaments when single 1·5 mm. long at time of flowering, when 2, filaments 1·25 mm. and then andropodium 0·75 mm. long ; anthers 1·5 mm. long ; ovary 1·5 mm. long ; stigmas 0·75 mm. ; capsule cylindrical, about 3·5 mm. long.

Fr.G.: falls of R. Kinkon, Pita (Nov.) *Abbayes* 898/1948 !

2. **I. garrettii** (*C. H. Wright*) *G. Tayl.* l.c. 67 (1953). *Dicraeia garrettii* C. H. Wright in F.T.A. 6, 1 : 126 (1909) ; F.W.T.A., ed. 1, 1 : 108, partly (excl. Fr.G. spec.). Branched herb up to 10 cm. with horny compressed stems ; leaves about 2 mm. long, irregularly lobed or 1–3-bifid, apparently soon deciduous and plant appearing leafless ; flowers in terminal fascicles ; fruiting pedicel 12 mm. long ; filaments 4 mm. long ; gynophore 1 mm. long ; capsule slightly compressed, 1·75 mm. long ; valves with 3 ribs and also marginal ribs.

S.L.: Sherbro (Oct.) *Garrett* !

3. **I. macrothyrsa** *G. Tayl.* l.c. 67 (1953). *Saxicolella macrothyrsa* A. Chev. Fl. Viv. 1 : 293, t. 43A (1938), French descr. only. Caulescent herb up to about 20 cm. ; stems branched dichotomously, flattened and 2–4 mm. broad ; spathellae terminal or lateral, in dense unilateral cymes, 3 mm. long, shortly pedunculate ; pedicel 6–8 mm. long ; stamen 1, filament 3–4 mm. long ; anthers 1–5 mm. long ; ovary ovoid, 1·5 mm. long ; gynophore 0·3 mm. long ; capsule 1·5–2 mm. long, valves 3-ribbed.
Fr.G.: Fouta Djalon, in branches of R. Dindia *Caille* in *Hb. Chev.* 14740.

4. **I. adamesii** *G. Tayl.* l.c. 69, t. 9 (1953). Dichotomously branched herb ; spathellae 1–3 at the tips of branches, narrowly obovoid with a tapering base ; pedicel flexuose within the spathella, about 7 mm. long, eventually erect and up to 10 mm. long ; tepals needle-like, about 1 mm. long ; filaments 2 mm. long ; andropodium 3 mm. long ; anthers 1·25 mm. long ; ovary about 2 mm. long, 6-ribbed excepting the inconspicuous commissural ribs ; gynophore 0·5 mm. long ; capsule valves equal and each 3-ribbed.
Port.G.: Chitale, Saltenho (Feb.) *Esp. Santo* 2670 ! **S.L.:** Kambia Bridge (Dec.) *Adames* 177 !

5. **I. ledermannii** (*Engl.*) *Engl.* Pflanzenw. Afr. 3, 1 : 274 (1915) ; Chev. Fl. Viv. 1 : 297, partly. *Dicraeia ledermannii* Engl. Bot. Jahrb. 43 : 381, t. 2, Q–X (1909). Branched herb with a ribbon-like thallus ; leaves scale-like, cartilaginous, 0·5 mm. long.
Iv.C.: foot of Mt. Do, near Gouékangouiné (May) *Chev.* 21421 ! Also in French Cameroons.

6. **I. pygmaea** *G. Tayl.* l.c. 72, t. 10 (1953). *Inversodicraea ledermannii* of A. Chev. Fl. Viv. 1 : 297, partly. Dwarf herb, up to 11 mm. including the pedicellate infructescence ; stems simple or occasionally branched at the base arising from a narrow ribbon-like thallus ; leaves linear-oblong, densely imbricated along the length of the stem, 3-toothed at the apex with the middle tooth longest, up to 1 mm. long ; spathellae sessile, apical, obovoid, up to 2 mm. long ; tepals needle-like, about 0·5 mm. long ; stamen 1, filament up to 1·5 mm. long ; anthers about 0·5 mm. long ; ovary ellipsoid, about 1·25 mm. long, slightly 6-ribbed ; gynophore about 0·3 mm. long ; stigmas subulate, about 0·3 mm. long ; capsule ellipsoid, 1·5 mm. long, valves equal 3-ribbed.
Fr.G.: Great Falls, Kindia (Dec.) *Abbayes* 353/1951 ! *Chev.* 20232 !

7. **I. tenuifolia** *G. Tayl.* l.c. 72, t. 11 (1953). Small caulescent herb with a flat basal thallus ; leaves sessile, exstipulate, up to 4·5 mm. long ; spathellae usually 2–3 produced on the dwarf rosulate shoots, subobovoid, about 2·75 mm. long ; flower within the spathella about 8 mm. high ; pedicel 2·5 mm. becoming up to 8 mm. long ; stamens 2, filaments up to 3 mm. long ; anthers 1 mm. long and 0·75 mm. broad ; ovary ellipsoid, about 1·75 mm. long, and 0·8 mm. broad, slightly 8-ribbed ; gynophore 0·5–0·75 mm. long ; capsule ellipsoid, 2 mm. long, valves equal, 3-ribbed excepting the thin marginal commissural ribs.
S.Nig.: R. Afi, on Boje-Aboabam path (Dec.) *Keay* FHI 28241 !

8. **I. musciformis** *G. Tayl.* l.c. 75, t. 12 (1953). Branched caulescent herb ; lower leaves scale-like, minute, needle-like or linear ; upper leaves linear-subulate, sheathing at the base, exstipulate, up to 14 mm. long ; spathellae at the ends of branches, ovoid, about 2·75 mm. long ; pedicel 2 mm. becoming up to 8 mm. long ; tepals acicular, 0·6 mm. long ; stamens 2, filaments about 0·8 mm. long ; andropodium about 0·5 mm. long ; anthers 0·75 mm. long and 0·7 mm. broad ; ovary ellipsoid or obovoid, 1·75 mm. long, slightly 8-ribbed ; capsule ellipsoid, 1·75 mm. long, valves equal 3-ribbed excepting the thin marginal commissural ribs.
Br.Cam.: N.W. slopes of Mba Kokeka Mt., Bamenda, 7,500 ft. (Jan.) *Keay* FHI 28542 !

9. **I. variabilis** *G. Tayl.* l.c. 75, t. 13 (1953). Dwarf herb with flowering stems from flat thallus ; leaves up to 7·5 mm. long ; spathellae ellipsoid or subovoid tapering and stipitate at the base, up to 3·25 mm. long ; pedicel 3·25 mm. (in fruit 4 mm.) long ; tepals about 0·5 mm. long ; filaments about 1 mm. long ; andropodium up to 1 mm. long ; anthers 1 mm. long ; ovary about 1·5 mm. long ; capsule 1·5 mm. long.
Br.Cam.: R. Mun Aiya, by Ikom-Mamfe road ferry (Jan.) *Keay* FHI 28688 !

10. **I. aloides** *Engl.* l.c. 3, 1 : 271, t. 175 (1915). Gregarious moss-like plant ; spathellae 1·5 mm. long ; pedicel up to 3 mm. ; stamens 1 or 2 ; filaments about 1 mm. long ; anthers about 1 mm. long ; ovary 1 mm. long ; capsule 1 mm. long ; stigmas shortly ellipsoid.
S.Nig.: R. Butum, (Dec.) *Keay* FHI 25150 ! Utanga, R. Butum (Dec.) *Keay* FHI 25153 ! Extends to Angola.

11. **I. keayi** *G. Tayl.* l.c. 78, t. 14 (1953). Leaves up to 2 mm. long ; spathellae solitary at the ends of short congested leafy shoots, about 2·5 mm. long ; pedicel 2 mm. (in fruit 3 mm.) long ; filaments about 0·5 mm. long ; andropodium about 0·5 mm. long ; anthers 0·75 mm. long ; ovary about 1·5 mm. long ; gynophore about 0·5 mm. long ; stigmas botuliform, about 0·5 mm. long ; capsules 1·5 mm. long.
Br.Cam.: Banso, Bamenda, 5,400 ft. (Jan.) *Keay* FHI 28457 ! Near Sagbo, Ndop (Mar.) *Adams* 11073 !

28. ELATINACEAE

Herbs or low shrubs. Leaves opposite or verticillate, simple ; stipules present, paired. Flowers small, actinomorphic, hermaphrodite, axillary, solitary or cymose. Sepals 3–5, free, imbricate. Petals as many, hypogynous, imbricate, persistent. Stamens from as many to twice as many as the petals, free, hypogynous ; anthers 2-celled, opening by longitudinal slits. Ovary superior, 3–5-celled ; placentation axile ; styles 3–5, free ; ovules numerous. Fruit a septicidal capsule. Seeds without endosperm, straight or curved ; embryo with short cotyledons.

Widely spread in the warmer parts of the world. Resembling *Caryophyllaceae* and *Lythraceae*, but differing from the former by the several-celled ovary and the absence of endosperm, from the latter by the free imbricate sepals and the erect anthers in bud.

Sepals and petals usually 5, sepals membranous on the margin, acute at apex, usually with a strong median nerve ; stamens 5–12 ; ovary 5-celled (rarely 4), narrowed to the apex into the free styles ; capsule subcrustaceous .. .. .. 1. **Bergia**
Sepals, petals and stamens 3 (in our species ; sepals and petals 2–4 and stamens up to 8 in other species) ; sepals membranous, obtuse at apex, without a strong median nerve ; ovary 3-celled (more in other species), depressed at apex, style short ; capsule membranous .. .. 2. **Elatine**

1. BERGIA Linn.—F.T.A. 1 : 152.

Shrubby ; sepals 4–5 mm. long, acute to acutely acuminate ; petals subequal to sepals; leaves pseudo-verticillate, the larger ones elliptic, narrowed into a short petiole, up to 3 cm. long and 1 cm. broad, closely serrate, scabrid-pubescent 1. *suffruticosa*

Herbaceous ; sepals at most 1·5 mm. long ; leaves paired ; flowers in dense verticillate clusters :

Stems and leaves more or less pubescent, stems slender or wiry, not succulent ; leaves varying from oblanceolate to linear-elliptic, sharply and distinctly serrulate or nearly entire, 0·8–2·5 cm. long ; stamens 5–12 .. .. .. 2. *ammannioides*

Stems and leaves glabrous, stems succulent ; leaves lanceolate, tapering at each end, 1–5 cm. long, entire ; stamens 10 .. .. 3. *capensis*

1. **B. suffruticosa** (*Del.*) *Fenzl*—F.T.A. 1 : 153 ; Chev. Fl. Viv. 1 : 300. *Lancretia suffruticosa* Del. (1813). *B. guineensis* Hutch. & Dalz. F W.T.A., ed. 1, 1 : 109 (1927) ; Kew Bull. 1928 : 27. A heath-like undershrub, often covering large patches of ground ; flowers with stamens and ovary often pink, frequented by bees.
Sen.: *Roger* ! *Heudelot* ! **Fr.Sud.:** Niala near Djenne (June) *Chev.* 1134 ! Akaka (May) *Hagerup* 85 ! Timbuktu (July) *Hagerup* 165 ! **Iv.C.:** Assikaso (Dec.) *Chev.* 22577 ! **Fr.Nig.:** several localities *fide* Chev. *l.c.* **N.Nig.:** Sokoto (Mar., Dec.) *Moiser* 192 ! 255 ! Katagum (July) *Dalz.* 190 ! Nguru (June) *Onochie* FHI 23340 ! Kukawa (Jan.) *E. Vogel* 14 ! Extends from Mauritania to the Red Sea, Arabia and India. (See Appendix, p. 29.)

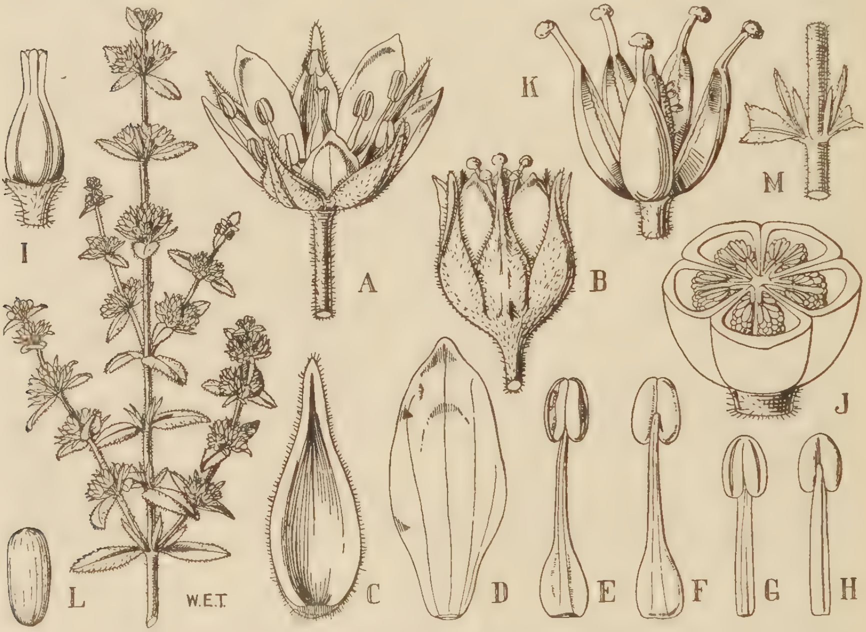

FIG. 45.—BERGIA SUFFRUTICOSA (*Del.*) *Fenzl* (ELATINACEAE).

A, open flower. B, flower not fully opened. C, sepal from within. D, petal. E, F, stamen of outer row, front and back. G, H, stamen of inner row. I, ovary. J, cross-section of ovary. K, capsule separating into valves. L, seed. M, portion of stem showing leaf-bases and stipules.

2. **B. ammannioides** *Heyne ex Roth* Nov. Pl. Sp. 219 (1821) ; F.T.A. 1 : 152 ; Chev. Fl. Viv. 1 : 301. *B. peploides B. erecta* and *B. pentandra* all of Guill. & Perr.—F.W.T.A., ed. 1, 1 : 109. Erect or decumbent herb of moist places and dried-up pools ; flowers white or pink.
Sen.: Richard Tol (Dec.) *Perrottet* ! Walo (Feb.–Apr.) *Leprieur* ! *Guillemin* ! *Perrottet* ! **Fr.Sud.:** Gao (Mar.) *De Wailly* 4985 ! Timbuktu (June, July) *Hagerup* 115 ! 180 ! **Fr.Nig.:** Maradi to Maroua *Chev.* 43700. Widespread in the drier parts of tropical Africa, Asia and Australia. [Further study of this widespread species may reveal distinct entities, but the forms described by Guillemin and Perrottet do not appear to me to be specifically distinct.—R.W.J.K.]

3. **B. capensis** *Linn.* Mant. Pl. Alt. 241 (1771) ; Milne-Redhead in Kew Bull. 1948 : 450. *B. verticillata* Willd.—F.T.A. 1 : 152. Aquatic herb with pink succulent stems procumbent and rooting at the nodes or erect. **Gam.:** Kuntaur *Ruxton* 117 ! **G.C.:** Shai, near Agomeda (June) *Irvine* 1643*a* ! Also in Tanganyika, A.-E. Sudan and Egypt, and in Asia, but *not* in S. Africa.

2. ELATINE Linn.—Niedenzu in Engl. Pflanzenfam. 21 : 274 (1925).

Much-branched aquatic herb, submerged or floating, glabrous ; leaves opposite, oblanceolate, obtuse, to 1·5 cm. long ; flowers solitary and sessile in the leaf axils, trimerous, with 3 stamens ; capsule depressed-globose, about 1 mm. diam. *triandra*

E. triandra *Schkuhr*—Niedenzu l.c. 276 ; Chev. Fl. Viv. 1 : 299. *E. triandra* var. *major* Trochain in Assoc. Fr. Avanc. Sci. 1936 : 343, with fig.
Sen.: *Leprieur* ! Richard Tol (Jan.) *Perrottet.* Near M'Bane *Trochain* 2232. Also in Europe (north to Finland), N. Africa and America. [Leprieur's specimen at Kew is too poor for certain identification but is likely to be the same as the others collected in Senegal.—R.W.J.K.]

29. CARYOPHYLLACEAE

Herbs, annual or perennial ; leaves opposite, simple, often connected at the base by a transverse line ; stipules absent or if present often scarious. Flowers actinomorphic, mostly hermaphrodite, solitary or in cymes. Sepals free or united into a tube, imbricate, often with membranous margins. Petals as many as the sepals, often small or absent. Stamens up to 10, free from one another or slightly united at the base ; anthers 2-celled, dehiscing longitudinally. Ovary superior, sessile or shortly stipitate, 1-celled or imperfectly divided at the base, with free-central placentation ; styles free or variously connate ; ovules mostly numerous. Capsule opening by valves or apical teeth. Seeds with endosperm and a more or less curved peripheral or excentric embryo.

Widely distributed in the North Temperate Zone, especially in the Mediterranean region ; comparatively rare in the tropics and mostly at high elevations.

Stipules absent ; stamens 10 or fewer :
 Sepals free from one another ; ovary sessile :
  Petals bifid :
   Styles 5, opposite the sepals ; capsule more or less cylindrical .. 1. **Cerastium**
   Styles 3, alternate with the sepals ; capsule globose to oblong .. 2. **Stellaria**
  Petals entire ; styles 5 ; capsule opening by valves .. .. .. 3. **Sagina**
 Sepals connate in the lower half ; stamens 5 or 10 ; styles 5 ; ovary sessile ; straggling herb with long-pilose branches .. .. 4. **Uebelinia**
 Sepals connate into a tube ; styles 3 ; stamens 10 ; ovary stipitate ; capsule dehiscing by 3 or 6 teeth or valves ; erect herbs .. .. 5. **Silene**
Stipules present, rarely inconspicuous ; sepals free ; stamens 5 or fewer :
 Stipules small and interpetiolar, divided into subulate segments, not scarious ; styles 3, connate below ; capsule 3-valved ; filaments shortly united at the base 6. **Drymaria**
 Stipules large and conspicuous, scarious, not divided :
  Sepals with a thick green keel and membranous margins .. .. 7. **Polycarpon**
  Sepals not keeled, uniformly membranous .. .. 8. **Polycarpaea**

1. CERASTIUM Linn.—F.T.A. 1 : 140.

Stems weak, with very long internodes, slightly glandular-pilose in the upper parts ; leaves up to about 3·5 cm. long ; flowers in small terminal few-flowered cymes ; sepals scarcely membranous on the margin ; capsule a little longer than the sepals 1. *indicum*
Stems rather short, with short internodes, densely glandular-pilose ; leaves up to about 1·5 cm. long ; flowers numerous, rather crowded in a leafy cyme ; sepals with broadly membranous margins ; capsule much exceeding the sepals 2. *octandrum*

1. **C. indicum** *Wight & Arn.* Prod. Fl. Pen. Ind. Or. 1 : 43 (1834) ; Möschl in Mem. Soc. Brot. 7 : 53 (1951), as var. *ruwenzoriense*. *C. africanum* (Hook. f.) Oliv. F.T.A. 1 : 141 ; F.W.T.A., ed. 1, 1 : 110. Weak, sparingly branched herb, 1–2 ft. high ; flowers white.
Br.Cam.: Cam. Mt., 7,000–10,000 ft. (Dec.) *Mann* 1941 ! *Johnston* 13 ! **F.Po:** St. Isabel Peak (Feb.) *Guinea* 2833 ! Also on the mountains of central and E. Africa from Abyssinia to L. Nyasa and Transvaal ; and in the Mascarene Islands.

2. **C. octrandrum** *Hochst. ex A. Rich.* Fl. Abyss. 1 : 45 (1847) ; Möschl l.c. 26 (1951), as var. *humile*. *C. vulgatum* of F.T.A. 1 : 140, not of Linn. *C. viscosum* of F.W.T.A., ed. 1, 1 : 110, not of Linn. Sticky herb, diffuse or ascending ; flowers white.
Br.Cam.: Cam. Mt., 7,000–12,000 ft. (Dec.–Jan.) *Mann* ! *Maitland* 813 ! 1255 ! L. Oku, Bamenda, 7,700 ft. (Jan.) *Keay* FHI 28468 ! Widespread on the mountains of central and E. Africa from Abyssinia to Tanganyika.

2. STELLARIA Linn.—F.T.A. 1 : 141.

Sepals acute at apex, without hyaline margins, densely covered with relatively short glandular hairs ; flowers few in lax terminal cymes ; leaves long-petiolate, petioles not clasping the stem ; lamina ovate, very acute to acuminate, with entire or crispate margin, 2–2·5 cm. long, 1–1·5 cm. broad ; internodes long ; stems drying yellowish 1. *mannii*
Sepals rounded to obtuse at apex, with hyaline margins, laxly covered with rather long glandular hairs ; flowers solitary from forks of leafy branches or in lax terminal cymes ; leaves variable, sessile to long-petiolate, petioles clasping the stem ; lamina at the most acute or apiculate at apex ; internodes short or long, with softly pubescent line ; stems drying pale green .. .. 2. *media*

1. **S. mannii** *Hook. f.*—F.T.A. 1 : 141 ; Exell Cat. S. Tomé 109. Diffuse straggling herb to 1 or 2 ft. high ; petals white ; native.
Br.Cam.: Cam. Mt., 5,500–7,600 ft. (Nov.–Mar.) *Mann* 1940 ! *Migeod* 43 ! *Maitland* 1014 ! *Brenan* 9518 ! **F.Po:** Moka (Jan.) *Guinea* 2239 ! Also in S. Tomé, Kenya, Tanganyika, Nyasaland and S. Rhodesia.

2. **S. media** (*Linn.*) *Vill.*—F.T.A. 1 : 141 ; Chev. Fl. Viv. 1 : 304 ; Exell l.c. 110. *Alsine media* Linn. (1753). Diffuse herb ; petals white ; introduced.

Fr.G.: Mali, 4,600 ft. *Chev.* **Br.Cam.:** Buea, 3,000 ft. (Jan.–Mar.) *Maitland* 192! *Brenan* 9333! **F.Po:** Moka (Jan.) *Tessman* 2869; *Guinea* 2010! 2061! Cosmopolitan weed, native in north temperate regions of Old World.

3. SAGINA Linn.—F.T.A. 1: 142.

A small often tufted herb; leaves linear, acute, up to 2·5 cm. long; pedicels 1 cm. long; sepals ovate-lanceolate, acute, glabrous; petals shorter than sepals *abyssinica*

S. abyssinica *Hochst. ex A. Rich.*—F.T.A. 1: 142. Perennial, forming little cushions; sepals green, petals white.
Br.Cam.: Cam. Mt., 9,000–12,000 ft. (Dec.–Mar.) *Mann* 1288! 2027! *Mildbr.* 10899! *Maitland* 1254! *Brenan* 9507! *Keay* FHI 28614! **F.Po:** 8,500 ft. (Apr.) *Mann*! *Guinea* 2836! Also in Abyssinia and E. African mountains.

4. UEBELINIA Hochst.—F.T.A. 1: 140; Th. C. E. Fries in Fedde Rep. 19: 81 (1923).

Stems hispid; leaves elliptic to orbicular, acute, margin and midrib setulose, narrowed at base to short-winged petiole, 7–15 mm. long, 4–9 mm. broad; flowers axillary; pedicels 1–3 mm. long, reaching 7–13 mm. in fruit; calyx 4–6 mm. long, 10-ribbed, setose, lobes acute; petals 2·5–3·5 mm. long; stamens 10 (or 5); capsule about 4 mm. long, persistent in the calyx .. .. *hispida*

U. hispida *Pax* in Engl. Bot. Jahrb. 17: 586 (1893). Prostrate herb with straggling stems to 18 in. long; petals white.
Br.Cam.: Cam. Mt., 7,000–8,000 ft. (Jan., Sept.) *Preuss* 971! *Maitland* 916! L. Oku, Bamenda, 7,800 ft. (Jan.) *Keay* FHI 28472!

5. SILENE Linn.—F.T.A. 1: 138.

Stems and leaves very shortly pubescent, not glandular; leaves narrowly linear, tapered to the apex; flowers in terminal cymose racemes, the pedicels in fruit up to 3 cm. long; calyx with strong coloured nerves, gradually tapered to the base *biafrae*

S. biafrae *Hook. f.*—F.T.A. 1: 139. Erect perennial herb, 6–30 in. high; calyx green with blackish-purple veins; petals blackish-purple above.
Br.Cam.: Cam. Mt., 9,000–12,000 ft. (Nov.–Mar.) *Mann* 2034! *Maitland* 1253! *Dalz.* 8328! *Brenan* 9508! *Keay* FHI 28609!

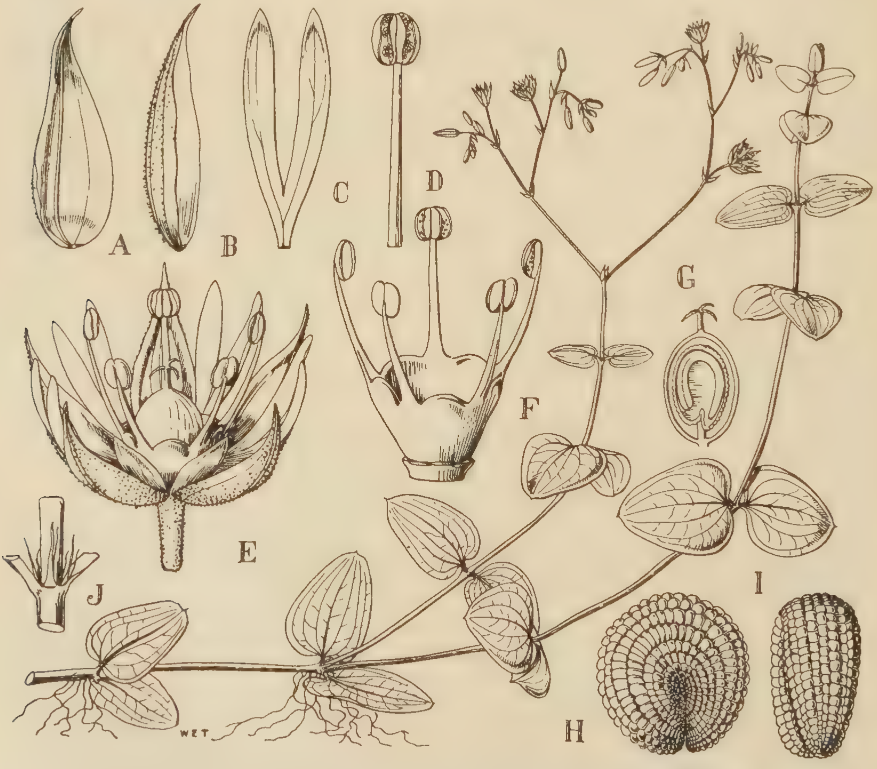

FIG. 46.—DRYMARIA CORDATA (*Linn.*) *Willd.* (CARYOPHYLLACEAE).

A B, sepals. C, petal. D, stamen. E, flower. F, stamens united at the base. G, longitudinal section of ovary. H, I, seed. J, stipules.

6. **DRYMARIA** Willd.—F.T.A. 1 : 143.

A weak straggling herb, glabrous or nearly so ; stems quadrangular ; leaves petiolate, opposite, distant, broadly ovate, rounded or subcordate at the base, mucronulate, 1–2·5 cm. long, up to 2 cm. broad, papery, 3–5-nerved ; stipules interpetiolar, divided into subulate segments ; flowers in terminal few-flowered puberulous cymes ; sepals oblong-lanceolate, about 5 mm. long, with a distinct midrib and 2 lateral nerves, becoming dry and membranous in fruit ; petals shorter than the sepals, bifid *cordata*

D. cordata (*Linn.*) *Willd.*—F.T.A. 1 : 143 ; Chev. Fl. Viv. 1 : 305. *Holosteum cordatum* Linn. (1753). Slightly viscid herb with white flowers, stems up to 3 ft. long.

Fr.G.: Fouta Djalon (Sept.) *Chev.* 18682. Dalaba-Diaguissa Plateau (Oct.) *Chev.* 18716. **S.L.**: Yakala (Sept.) *Thomas* 2383 ! Kailahun (Feb.) *Deighton* 4007 ! **Iv.C.**: Gouekouma, Upper Sassandra (May) *Chev.* 21652 ! **S.Nig.**: Ikwette Plateau, Obudu (Dec.) *Keay & Savory* FHI 25191 ! **Br.Cam.**: Cam. Mt., 7,000 ft. (Dec., Jan.) *Mann* 1319 ! Bambui, Bamenda (Jan.) *Keay* FHI 28423 ! **F.Po**: (Nov., Dec.) *Mann* 581 ! *Guinea* 676 ! Widely dispersed in tropics and sub-tropics.

7. **POLYCARPON** Linn.—F.T.A. 1 : 144.

A straggling herb sparsely clothed with branched hairs ; leaves opposite or verticillate, oblanceolate or sublinear, acute, up to 1·5 cm. long and about 4 mm. broad ; stipules scarious, ovate-lanceolate, acute, about ¼ the length of the leaves ; flowers very numerous in paniculate bracteate cymes ; sepals with a thick keel and broad membranous margins, minutely ciliolate .. .. *prostratum*

P. prostratum (*Forsk.*) *Asch. & Schweinf.* in Ost. Bot. Zeitschr. 39 : 128 (1889) ; Milne-Redhead in Kew Bull. 1948 : 451 (*q.v.* for full synonymy). *Alsine prostratra* Forsk. (1775). *P. loeflingii* Benth. in Benth. & Hook. f. Gen. Pl. 1 : 153 (1862) ; F.T.A. 1 : 144 ; F.W.T.A., ed. 1, 1 : 111 ; Chev. Fl. Viv. 1 : 306. *P. memphiticum* (Del.) Fenzl ex Broun & Massey ; Chev. Fl. Viv. 1 : 307. *P. glaucifolium* A. Chev. Fl. Viv. 1 : 306 (1938), French descr. only. Annual herb on sand banks and mud of river beds.

Sen.: R. Senegal (Apr., May) *Leprieur* ! **Fr.Sud.**: Sienso, San (June) *Chev.* 1043 ! Day (Aug.) *Chev.* 1337 ! L. Debo (May) *Hagerup* 152*a* ! Kabara (Sept.) *Hagerup* 308 ! **S.L.**: Samaia (May) *Thomas* 182 ! Njala (May) *Deighton* 643 ! Makump (May) *Deighton* 1706 ! **Iv.C.**: Mankono *Chev.* 21943. **G.C.**: (May) *Irvine* 1794 ! **Dah.**: R. Oueme *Chev.* 23588. **Fr.Nig.**: *fide* Chev. *l.c.* **N.Nig.**: Katagum (July) *Dalz.* 191 ! Abinsi (May) *Dalz.* 716 ! Nupe *Barter* 1713 ! **S.Nig.**: Aboh *Barter* 193 ! R. Oni, Akilla (Apr.) *Jones* FHI 17248 ! Widespread in tropics of Old and New World.

8. **POLYCARPAEA** Lam.—F.T.A. 1 : 144 ; Pax in Engl. Bot. Jahrb. 17 : 588 (1893).

Sepals loosely pubescent, 1·5–2 mm. long, silvery ; leaves linear about 1–1·5 cm. long, with fine setose points ; dwarf annual, very diffuse with very numerous flowers in lax cymes spreading all over the plant .. .. 1. *eriantha*

Sepals glabrous :

Leaves obtuse, glabrous, lanceolate, finely punctate, about 1 cm. long and 2–3 mm. broad, rather obscurely 3-nerved ; stipules about half as long as the leaves, with long filiform tips ; flowers few in densely clustered heads .. 2. *glabrifolia*

Leaves linear with fine setiform tips :

Sepals 1–2 mm. long, wholly golden or deep reddish-brown ; flowers numerous in lax cymes ; leaves linear to acicular 7–15 mm. long, stems densely to sparingly pubescent ; plant often perennial, much branched .. .. 3. *tenuifolia*

Sepals 2 mm. or more long, silvery but sometimes with golden or reddish coloured markings on tips or at base :

Flowers in compact many-flowered globose heads, solitary at the ends of the branches ; inflorescence branches within each head not apparent ; heads 0·8–3 cm. in diam. ; sepals silvery, without coloured markings ; leaves linear, up to 3 cm. long and 2 cm. broad .. .. 4. *linearifolia*

Flowers in lax cymes, or in compact corymbs with the inflorescence branches within each corymb quite apparent, or in small few-flowered heads laxly arranged in cymes :

Flowers in small (about 5 mm. diam.), few-flowered (5–15) heads, the heads laxly arranged in cymes ; sepals wholly silvery, very acute, 2–2·5 mm. long ; leaves up to 2 cm. long and linear below, acicular 5–10 mm. long above ; stipules with very long points, more than half as long as the leaves ; plant erect, little branched 5. *stellata*

Flowers in lax cymes or compact corymbs :

Flowers in compact corymbs, sometimes head-like but always with the lower inflorescence branches within each corymb quite apparent (contrasting with *linearifolia*) ; sepals 3–4 mm. long, very acute, rather jagged at the tips and usually tinged reddish at the tips (in W. African specimens), otherwise silvery ; leaves linear, up to 2 cm. long and 1 mm. broad ; plant well branched but erect and not diffuse .. .. 6. *corymbosa* var. *corymbosa*

Flowers in very numerous lax cymes, much branched and spreading all over the very diffuse richly branched plant (similar in habit to *eriantha* but sepals glabrous) ; sepals 2–3 mm. long, acute, silvery with reddish marking at base 6a. *corymbosa* var. *effusa*

1. **P. eriantha** *Hochst. ex A. Rich.* Fl. Abyss. 1 : 303 (1848) ; Chev. Fl. Viv. 1 : 312. *P. corymbosa* of F.T.A. 1 : 145, partly. *P. corymbosa* var. *eriantha* (Hochst. ex A. Rich.) Pax in Engl. Bot. Jahrb. 17 : 590. *P. stellata* of Chev. Bot. 47, not of DC. Much-branched annual, up to 9 in. high, often much less ; petals reddish.
Sen.: Bondou *Heudelot* 135 ! **Gam.**: *Saunders* 90 ! **Fr.G.**: Kouroussa *Pobéguin* 459 ! **Fr.Sud.**: *fide* Chev. *l.c.* **G.C.**: Accra (May, Oct.) *Ansell* ! *Brown* 330 ! Navrongo, N.T. (Nov.) *Vigne* 4669 ! **Fr.Nig.** (Oct.) *Hagerup* 492 ! **N.Nig.**: Sokoto (Sept.–Nov.) *Dalz.* 440 ! *Moiser* 28 ! Bauchi Plateau (Aug.) *Lely* P. 593 ! Fika, Bornu (Oct.) *Daggash* FHI 24871 ! Widely distributed in tropical Africa. (See Appendix, p. 29.)

2. **P. glabrifolia** *DC.* Prod. 3 : 374 (1828) ; F.T.A. 1 : 146 (excl. distrib. Senegal and Kordofan) ; Chev. Fl. Viv. 1 : 312. *P. platyphylla* Pax l.c. 591 [not *P. platyphylla* of Chev. Bot. 40]. Herb on seashore above high water.
S.L.: *Don* ! Turtle Isl. (Nov.) *Deighton* 2313 ! Messima (Apr.) *Adames* 34 ! **Lib.**: Grand Bassa (July) *T. Vogel* 69 ! Monrovia (Nov., Dec.) *Krause* ; *Linder* 1424 ! (See Appendix, p. 29.)

3. **P. tenuifolia** (*Willd.*) *DC.* l.c. (1828). *Achyranthes tenuifolia* Willd. in Sp. Pl., ed. 4, 1 : 1196 (1798). *P. corymbosa* var. *parviflora* Oliv. F.T.A. 1 : 145 ; Pax l.c. 589. *P. corymbosa* of Chev. Fl. Viv. 1 : 309. *P. djalonensis* A. Chev. l.c. 311 (1938), French descr. only. *P. holliensis* A. Chev. l.c. 311 (1938), French descr. only. Erect herb, often perennial ; with golden or deep reddish-brown sepals.
Fr.G.: Fouta Djalon between Timbo and Ditinn (Sept.) *Chev.* 18398 ! Kouroussa (July) *Pobéguin* 323 ! **Fr.Sud.**: Balani (Oct.) *Chev.* 2708. **S.L.**: *Afzelius* ! **G.C.**: Mpuasu, Ashanti (Dec.) *Vigne* 3494 ! **Dah.**: Hollis country, between Mosse and Ketou (Feb.) *Chev.* 23007 ! Widespread in tropical Africa.

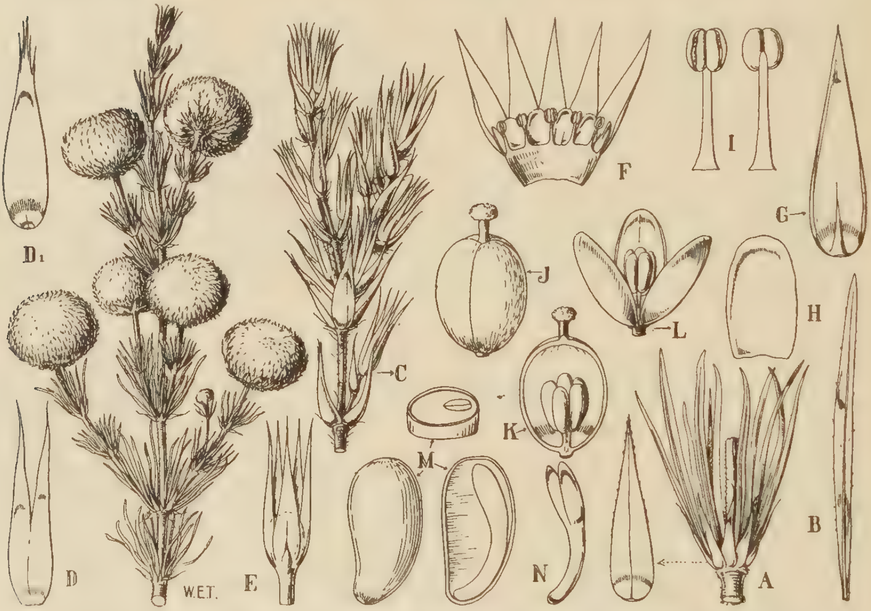

FIG. 47.—POLYCARPAEA LINEARIFOLIA (*DC.*) *DC.* (CARYOPHYLLACEAE).

A, node showing leaves and stipules, one stipule detached. B, leaf. C, a branch from the inflorescence, enlarged. D, D1, bracts from the inflorescence. E, calyx. F, flower laid open. G, sepal. H, petal. I, stamens, front and back. J, ovary. K, the same in vertical section. L, capsule opening by 3 valves. M, seed, with longitudinal and cross-sections. N, embryo.

4. **P. linearifolia** (*DC.*) *DC.* l.c. (1828) ; F.T.A. 1 : 146 ; Chev. Fl. Viv. 1 : 313. *Paronychia linearifolia* DC. in Lam. Encyl. 5 : 26 (1804). Erect herb, to 2 ft. high, annual or perennial.
Sen.: *Sieber* 60 ! Walo (Sept.) *Perrottet* ! Fouràchaux (Dec.) *Leprieur* ! **Fr.Sud.**: Gao (Nov.) *Hagerup* 362 ! And other localities *fide* Chev. *l.c.* **Iv.C.**: Bouaké (July) *Chev.* 22122 ! **G.C.**: Krobo (Nov., Dec.) *Johnson* 498 ! *Irvine* 1706 ! Takiman, Ashanti (July) *Chipp* 532 ! Tamale (Oct.) *Williams* 405 ! **Togo**: Sokode-Basari *Schröder* 113 ! Lome *Warnecke* 10 ! Kpedsu (Dec.) *Howes* 1037 ! **Dah.**: *Poisson* ! **Fr.Nig.**: *fide* Chev. *l.c.* **N.Nig.**: Sokoto (Sept., Oct.) *Moiser* 103 ! *Dalz.* 438 ! Nupe *Barter* 554 ! 1005 ! Yola (Sept.) *Dalz.* 48 ! **S.Nig.**: Abeokuta *Irving* 65 ! Ilaro (Jan.) *Millen* 108 ! Ubolo, Onitsha (Aug.) *Jones* FHI 5865 ! Udi *Kitson* ! Widespread in tropical Africa. (See Appendix, p. 29.)

5. **P. stellata** (*Willd.*) *DC.* l.c. (1828) ; F.T.A. 1 : 145 ; Chev. Fl. Viv. 1 : 314. *Achyranthes stellata* Willd. (1798). Erect, to 1 ft. high.
Fr.G.: Kankan *Brossart* in *Hb. Chev.* 15659. **G.C.**: Accra *Thonning* ! **S.Nig.**: Idah (Sept.) *T. Vogel* !

6. **P. corymbosa** (*Linn.*) *Lam.* var. **corymbosa**—Tab. Encycl. 2 : 129 (1797) ; F.T.A. 1 : 145, partly. *Achyranthes corymbosa* Linn. Sp. Pl. 205 (1753). *P. grandiflora* (Pax) A. Chev. Fl. Viv. 1 : 313. Erect herb with dense corymbs, to 1 ft. high ; sepals often tinged reddish at the tips, petals reddish.
Sen.: *Heudelot* 225 ! *Perrottet* 353 ! *Leprieur* ! Walo (Sept.) *Perrottet* ! **Fr.G.**: Kouroussa (Oct.) *Pobéguin* 557 ! **Fr.Sud.**: Gao (Sept.) *Hagerup* 338 ! **Iv.C. & Dah.**: *fide* Chev. *l.c.* **Fr.Nig.**: Niamey *Hagerup* 490 ! **N.Nig.**: Sokoto (Oct.) *Dalz.* 439 ! Anara F.R., Zaria (Nov.) *Keay* FHI 21676 ! Bauchi Plateau (Oct.) *Lely* P. 778 ! Katagum *Dalz.* 193 ! L. Chad *Golding* 58 ! Widespread in warmer parts of Africa, Asia and America. (See Appendix, p. 29.)

6a. **P. corymbosa** var. **effusa** *Oliv.* F.T.A. 1 : 145, partly (Barter's specimen only) ; Pax l.c. 590. Much-branched annual ; similar to *P. eriantha*.
G.C.: Accra (Oct.) *Dalz.* 105 ! *T. Vogel* ! Achimota (Sept.) *Irvine* 135 ! **N.Nig.**: Lokoja *Dalton* ! Nupe *Barter* 808 ! Widely distributed in tropical Africa.

30. MOLLUGINACEAE

Herbs. Leaves alternate or opposite; stipules none or very small and soon falling off. Flowers actinomorphic, hermaphrodite, solitary or cymose, usually small and inconspicuous. Sepals free or united at the base only, imbricate. Petals small or absent. Stamens hypogynous or slightly perigynous, definite or many; filaments free to connate at the base; anthers 2-celled, opening lengthwise. Ovary syncarpous (except *Gisekia*), usually several-celled; styles or stigmas as many as the cells; ovules curved or inverted. Fruit dry, dehiscing into the cells or by a transverse slit, rarely indehiscent, calyx usually persistent. Seeds with endosperm, the embryo curved.

Mostly weedy plants of dry places, distinguished from the *Ficoidaceae*, with which they were formerly united, by the hypogynous flowers and free sepals.

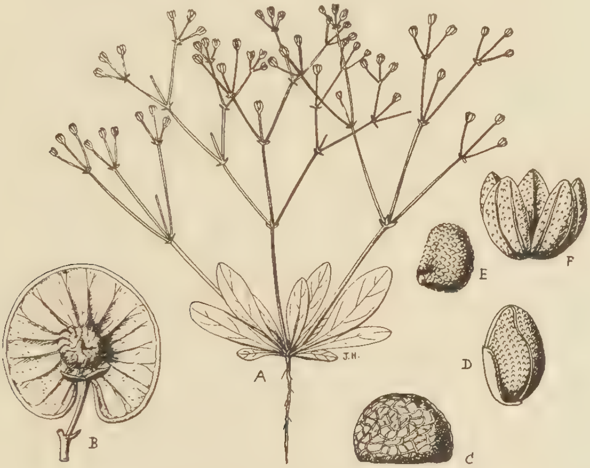

FIG. 48.—MOLLUGINACEAE.

A, *Mollugo nudicaulis* Lam. E, seed of same. B, fruit of *Limeum pterocarpa* (Gay) Heimerl. C, fruit of *Limeum diffusum* (Gay) Schinz. D, seed of *Glinus lotoides* Linn. F, fruit of *Gisekia pharnacioides* Linn.

Fruit indehiscent:
- Ovary syncarpous, fruit 2-coccous .. .. 1. **Limeum**
- Ovary and fruit apocarpous, with 5 carpels; leaves marked with numerous raphides 2. **Gisekia**

Fruit a dehiscent 3–5-valved capsule:
- Seeds without a strophiole; erect plants, glabrous and often glaucous; radical leaves different from the stem leaves, or all leaves radical .. .. 3. **Mollugo**
- Seeds with a conspicuous strophiole; diffuse or ascending herbs, tomentose or pubescent; no radical leaves .. .. 4. **Glinus**

1. LIMEUM Linn.—F.T.A. 2: 595; Schellenb. in Engl. Bot. Jahrb. 50, Suppl. 152 (1914). *Semonvillea* Gay—F.T.A. 2: 593.

Fruits not winged, shorter or only slightly longer than the calyx:
- Plant glabrous; leaves linear, acute, up to 2 cm. long, alternate; flowers in leaf-opposed subsessile or pedunculate clusters; sepals oblong-elliptic, very acute; fruits rugose .. .. 1. *diffusum*
- Plant viscous-pubescent; leaves obovate, spathulate or suborbicular, rounded at apex; mucronate:
  - Leaves 8-25 mm. long, and about 10 mm. broad, alternate; petals absent; flowers in leaf-opposed cymes terminating short leafy lateral branchlets; sepals broadly elliptic, obtuse; fruits tuberculate .. .. 2. *viscosum*
  - Leaves 4–8 mm. long and almost as broad, more or less opposite; petals present; flowers in sessile or subsessile axillary clusters; sepals broadly elliptic, acute; fruits smooth .. .. 3. *indicum*

Fruits broadly winged, much longer than the calyx; nearly glabrous; leaves alternate, linear or linear-lanceolate, subacute, up to 5 cm. long and 7 mm. broad; flowers few, in pedunculate subcapitate cymes ; sepals ovate-lanceolate, petals absent ; fruit orbicular, puberulous, separating into 2 broadly winged 1-seeded cocci, about 1 cm. in diam., the wings with radiating forked nerves and a very narrow membranous margin .. .. 4. *pterocarpum*

1. L. **diffusum** (*Gay*) *Schinz* in Bull. Herb. Boiss. 5, App. 3 : 69 (1897) ; Schellenb. in Engl. Bot. Jahrb. 50, Suppl. 158 (1914). *Gaudinia diffusa* Gay in Feruss. Bull. Sc. Nat. 18 : 412 (1829). *L. linifolium* of F.T.A. 2 : 596, partly ; F.W.T.A., ed. 1, 1 : 113 ; Chev. Fl. Viv. 1 : 328 ; not of (Presl) Fenzl in Ann. Wien. Mus. 1 : 342 (1836), based on *Dicarpaea linifolia* Presl (1832). A diffuse glabrous annual.
Sen.: R. Senegal (Oct.) *Leprieur* ! Richard Tol (Sept.) *Perrottet* ! **Fr.Sud.:** Timbuktu (July, Aug.) *Chev.* 1310 ; 2715. Goundam (Aug.) *Chev.* 2518. **Fr.Nig.:** Tiggarouba *Le Rumeur* 74. Also in Mauritania, and in Kanem east of L. Chad. [*L. linifolia* (Presl) Fenzl is based on a plant said to have been collected in the Cape of Good Hope by Sieber, and is probably the correct name for the S. African plant which is somewhat different.—R.W.J.K.] (See Appendix, p. 30.)

2. **L. viscosum** (*Gay*) *Fenzl* in Nov. Stirp. 87 (1839) ; F.T.A. 2 : 595 ; Chev. Fl. Viv. 1 : 328 ; Schellenb. l.c. 159. *Gaudinia viscosa* Gay l.c. *L. kotschyi* (Moq.) Schellenb. in Engl. Bot. Jahrb. 48 : 497 (1912). Annual, diffuse or ascending, 1 ft. or more high.
Sen.: *Sieber* 62 ! Dagana (Sept.) *Leprieur* ! Gandiole *Heudelot* 475 ! **Fr.Sud.:** Timbuktu (July) *Hagerup* 139 ! 230 ! 283 ! **N.Nig.:** Sokoto (Aug.) *Dalz.* 417 ! Extends to the A.-E. Sudan ; also in Mauritania and the Sahara.

3. **L. indicum** *Stocks ex T. Anders.* in J. Linn. Soc. 5, Suppl. 1 : 30 (1861) ; F.T.A. 2 : 596 ; Schellenb. in Engl. Bot. Jahrb. 50, Suppl. 160 ; Chev. Fl. Viv. 1 : 327. Plant of desert regions.
Fr.Sud.: Gao (Nov.) *Hagerup* 336 ! **Fr.Nig.:** Tayane *Le Rumeur* 45. Also in Mauritania, the Sahara, N.E. Africa, Arabia and India.

4. **L. pterocarpum** (*Gay*) *Heimerl* in E. & P. Pflanzenfam. 3, 1B : 9 (1889) ; Schellenb. l.c. 161. *Semonvillea pterocarpa* Gay l.c. ; F.T.A. 2 : 594 ; F.W.T.A., ed. 1, 1 : 113 ; Chev. Fl. Viv. 1 : 326. Erect or diffuse herb, in fields and waste places.
Sen.: *Leprieur* ! *Roger* ! *Heudelot* ! Richard Tol *Lelièvre* ! **Fr.Sud.:** Timbuktu (July) *Hagerup* 197 ! S. Macina (Sept.) *Chev.* 24826 ! And various other localities *fide* Chev. *l.c.* **Fr.Nig.:** Zinder *Tilho.* Tillabery *Rogeon* 503. **N.Nig.:** Sokoto (Aug.) *Dalz.* 415 ! Nguru (July) *Ujor* FHI 23905 ! Also in Mauritania, and extending to A.-E. Sudan and southern Africa.

2. **GISEKIA** Linn.—F.T.A. 2 : 593.

A rather variable weed, diffuse or decumbent ; leaves opposite or subopposite, varying from oblanceolate to linear, subacute or obtuse, up to 4 cm. long and 1 cm. broad, thickly clothed beneath with numerous conspicuous raphides ; flowers in sessile or pedunculate often many-flowered cymes at the nodes ; pedicels up to 1 cm. long ; sepals elliptic-rounded, trinerved, with hyaline margins ; petals absent ; carpels 5, muricate .. .. *pharnacioides*

G. pharnacioides *Linn.*—F.T.A. 2 : 593, incl. vars. *congesta* and *pedunculata* Oliv. ; Chev. Fl. Viv. 1 : 325. *G. linearifolia* Schum. & Thonn. (1827). *G. rubella* of Chev. Fl. Viv. 1 : 325, not of Hochst. (Hochstetter's type has the pedicels 6–12 mm. long and peduncles at least 5 mm. long ; the W. African plants referred to *G. rubella* by Chevalier have very short pedicels, 1–5 mm. long). The plant is often subject to a blight (*Exobasidium gisekiae* Allesch.) which renders it pink or wine-red in colour.
Sen.: *Heudelot* 498 ! *Richard* ! *Sieber* 63 ! **Fr.Sud.:** Zamblora (June) *Chev.* 988 ! Timbuktu (July) *Hagerup* 140 ! 199*a* ! **Iv.C. & Dah.:** *fide* Chev. *l.c.* **Togo:** Lome *Warnecke* 33 ! **N.Nig.:** Sokoto (Mar.–Sept.) *Moiser* 101 ! *Dalz.* 416 ! Nupe *Barter* 1734 ! Katagum *Dalz.* 136 ! Widespread in tropical and S. Africa, Madagascar and in Asia. (See Appendix, p. 30.)

3. **MOLLUGO** Linn.—F.T.A. 2 : 589 ; Pax & Hoffmann in Engl. Pflanzenfam. 16C : 226 (1934).

Cauline leaves absent ; leaves all radical, persistent, spathulate-oblanceolate, up to 6 cm. long and 2 cm. broad ; inflorescence laxly cymose-corymbose, the pedicels long and slender ; seeds minutely and closely muricate, black or very dark reddish-brown 1. *nudicaulis*

Cauline leaves present :

Flowers in lax terminal and axillary cymes with long slender peduncles and pedicels ; radical leaves persistent, spathulate-oblanceolate, up to 6 cm. long and 1·5 cm. broad ; cauline leaves oblanceolate or lanceolate ; seeds reddish-brown, minutely muricate .. .. 2. *pentaphylla*

Flowers subumbellate or in sessile or shortly pedunculate axillary clusters ; radical leaves soon disappearing :

Cauline leaves linear-acicular, pseudo-verticillate, obtuse ; radical leaves spathulate-obovate, up to 1·5 cm. long ; inflorescences subumbellate ; seeds smooth, triangular, pale brown .. .. 3. *cerviana*

Cauline leaves narrowly oblanceolate, 1–1·5 cm. long, 3–4 mm. broad ; flowers in sessile or shortly pedunculate clusters ; seeds smooth or ridged on the back, dark red or black .. .. 4. *verticillata*

1. **M. nudicaulis** *Lam.*—F.T.A. 2 : 591 : Chev. Fl. Viv. 1 : 391. An erect glabrous annual, 3–10 in. high ; in waste places ; flowers greenish-white.
Sen.: *Sieber* 13 ! Galam *Heudelot* 261 ! 430 ! **Fr.Sud.:** San (June) *Chev.* 1077 ! Gao (Sept.) *Hagerup* 334 ! **S.L.:** Berria (Mar.) *Sc. Elliot* 5423 ! Njala (Sept.) *Deighton* 2119 ! Rokupr (Feb.) *Jordan* 382 ! **Iv.C., Dah. & Fr.Nig.:** *fide* Chev. *l.c.* **G.C.:** Accra (June) *Dalz.* 116 ! Achimota (Sept.) *Irvine* 50 ! Aburi (Mar.) *Johnson* 958 ! **Togo:** Lome *Warnecke* 6 ! **N.Nig.:** Nupe *Barter* 1340 ! Katagum (July) *Dalz.* 195 ! Bichikki (May) *Lely* 181 ! Yola (July) *Dalz.* 51 ! **S.Nig.:** Lagos (Apr.) *Dennett* 497 ! Benin (Dec.) *Brenan* 8636 ! Calabar (Apr.) *Holland* 83 ! Widespread in tropical Africa and Asia. (See Appendix, p. 30.)

2. **M. pentaphylla** *Linn.*—Pax & Hoffmann in E. & P. Pflanzenfam. 16C : 227 (1934). *M. striata* Linn. An introduced weed.
Br.Cam.: Moyuka, Victoria (May) *Maitland* 1177 ! Ndifo, Kumba (Apr.) *Olorunfemi* FHI 30524 ! Widespread in Asia, extending to China, Japan and Java.

3. **M. cerviana** (*Linn.*) *Seringe*—F.T.A. 2 : 591 ; Chev. Fl. Viv. 1 : 320. *Pharnaceum cerviana* Linn. (1753). An erect glaucous annual, often much-branched, 2–6 in. or more high ; in sandy places, river-beds, etc. **Sen.:** Walo *Heudelot* ! **Gam.:** *Saunders* 43 ! **Fr.Sud.:** Bougouni (Apr.) *Chev.* 683 ! Timbuktu (Aug.) *Hagerup* 257 ! L. Debo (May) *Hagerup* 153 ! **Fr.G., Fr.Nig. & Dah.:** *fide* Chev. *l.c.* **G.C.:** Accra (May, Nov.) *Dalz.* 117 ! *Irvine* 806 ! Tamale (Apr.) *Dalz.* 58 ! **Togo:** Lome *Warnecke* 4 ! **N.Nig.:** Katagum (July) *Dalz.* 192 ! Nupe *Barter* 1726 ! Yola (Jan.) *Dalz.* 49 ! Widespread in tropical Africa, northwards to N. Africa and Europe, and in Asia and Australia.

4. **M. verticillata** *Linn.*—F.T.A. 2 : 591 ; Chev. Bot. 301. *M. chevalieri* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 114 (1927) ; Kew Bull. 1928 ; 27 ; Chev. Fl. Viv. 1 : 321. A glabrous annual.
Fr.Sud.: San, banks of R. Bani (June) *Chev.* 1080 ! Hann (Aug.) *Berhaut* 1110 ! **S.L.:** Yoni (Nov.) *Deighton* 2287 ! **Iv.C.:** Attié *Chev.* 22684. Widespread in tropical America, also in Angola.

4. **GLINUS** Linn.—F.T.A. 2 : 589 as *Mollugo* Linn. in part.

Perianth segments more or less densely covered with stellate hairs, mucronate at apex ; leaves obovate, slightly apiculate, about 3 cm. long, including petiole, 1 cm. or more broad, densely stellate to almost glabrous ; flowers subsessile, or the pedicels shorter than the calyx ; seeds granular-verrucose .. .. 1. *lotoides*
Perianth segments glabrous, without a mucro ; leaves oblanceolate, slightly toothed towards apex, glabrous or nearly so, 2·5–3 cm. long, up to 0·75 cm. broad ; flowers on pedicels much longer than the calyx ; seeds as above .. .. 2. *oppositifolius*

1. **G. lotoides** *Linn.* Sp. Pl. 463 (1753) ; Pax & Hoffmann in E. & P. Pflanzenfam. 16C : 222 (1934) ; Chev. Fl. Viv. 1 : 322. *Mollugo glinus* A. Rich.—F.T.A. 2 : 590. ?*G. dahomensis* A. Chev. Fl. Viv. 1 : 322 (1938), French descr. only. A herb of moist sandy places ; very variable.
Sen.: *Roger* 66 ! **Gam.:** Albreda *Heudelot* 260 ! **Fr.Sud.:** Zamblora (June) *Chev.* 991 ! Mopti, by R. Niger (May) *Hagerup* 72 ! Bamba *Hagerup* 327 ! **Fr.G.:** Kouroussa (Dec.) *Pobéguin* 605 ! **S.L.:** Samaia (May) *Thomas* 245 ! Mange (Feb.) *Deighton* 4978 ! **Fr.Nig. & Dah.:** *fide* Chev. *l.c.* **N.Nig.:** Zurmi (Apr.) *Keay* FHI 15877 ! Nupe *Barter* 828 ! 1087 ! 1684 ! 1723 ! Jebba (Dec.) *Hagerup* 699 ! Takwara (May) *Lely* 101 ! Bauchi Plateau (Feb.) *Lely* P. 144 ! Abinsi (May) *Dalz.* 715 ! Found in tropics and subtropics generally. (See Appendix, p. 30.)

2. **G. oppositifolius** (*Linn.*) *Aug. DC.* in Bull. Herb. Boiss. Sér. 2, 1 : 559 (1901) ; Chev. Fl. Viv. 1 : 324. *Mollugo oppositifolia* Linn. (1753). *Mollugo spergula* Linn.—F.T.A. 2 : 590 ; Chev. Bot. 301. *G. spergula* (Linn.) Steud. Habitat as in the preceding species, greenish flowers.
Sen.: *fide* Chev. *l.c.* **Fr.Sud.:** Timbuktu (Aug.) *Hagerup* 247 ! And other localities. **S.L.:** Madina (Apr.) *Sc. Elliot* 5561 ! Juring (Dec.) *Deighton* 297 ! Makump (May) *Deighton* 1707 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** R. Volta (Mar.) *Dalz.* 106 ! R. Pra, Ashanti *Irvine* 432 ! Accra (Apr.) *Irvine* 1589 ! **Togo:** Lome *Warnecke* 299 ! **N.Nig.:** Nupe *Barter* 1343 ! **S.Nig.:** Lagos *Millen* 72 ! Abeokuta *Irving* 160 ! Benin Div. (Jan., Feb.) *Brenan* 8925 ! 9169 ! Port Harcourt (June) *Maitland* ! Found in tropics and subtropics generally.

Hauman in Fl. Congo Belge 2 : 106 (1951) has divided these two wide-ranging and variable weeds into several species and varieties. Some of these forms occur also in our area, but I am following Pax and Hoffmann in E. & P. Pflanzenfam. 16C : 212 (1934) in recognizing only the above two species in this Flora, pending a revision covering the whole of the vast range of the genus. Difficult nomenclature as well as taxonomical problems are involved, and Hauman's treatment is not free from objection.—R.W.J.K.

31. FICOIDACEAE

Herbs or low shrubs, often fleshy. Leaves alternate or opposite, sometimes very small, stipulate or not. Flowers actinomorphic, usually hermaphrodite. Calyx-tube free or adnate to the ovary ; lobes 5–8, imbricate or rarely valvate, herbaceous. Petals numerous or absent, 1- or more-seriate, inserted in the calyx-tube. Stamens perigynous, many or few, rarely 1, free or united at the base into bundles ; anthers 2-celled, small, opening lengthwise. Ovary superior or inferior, 1–several-celled ; ovules solitary to many, basal, apical or axile. Fruit a capsule or nut-like and drupaceous, often clasped by the persistent calyx.

Generally found on sandy shores and desert places, mainly in the subtropics ; comparatively rare in America. Recognized by the usually fleshy habit, opposite leaves, small or narrow petals, several-celled ovary with axile placentas, endospermic curved seeds and curved embryo.

Ovary 3 (–5)-celled ; styles 3 (–5) ; maritime plant .. .. .. 1. **Sesuvium**
Ovary 1–2-celled ; styles 1–2 ; terrestrial plants .. .. .. 2. **Trianthema**

1. **SESUVIUM** Linn.—F.T.A. 2 : 585.

A diffuse succulent glabrous herb with procumbent stems often rooting at the nodes ; leaves opposite, succulent, linear-oblanceolate to obovate, obtuse, up to 4·5 cm. long and 1 cm. broad ; flowers axillary, solitary, pedicellate, purplish or rose ; calyx deeply 5-lobed, obconic at the base, lobes ovate-lanceolate with a small dorsal horn at the apex and fairly broad membranous margins ; petals none ; ovary 3-celled, superior ; seeds black and nearly smooth .. .. *portulacastrum*

S. **portulacastrum** (*Linn.*) *Linn.* Syst. Nat., ed. 10, 2 : 1058 (1759) ; F.T.A. 2 : 585 ; Chev. Fl. Viv. 1 : 330. *Portulaca portulacastrum* Linn. Sp. Pl. 1 : 446 (1753). Common on the shores of the tropics and subtropics of both hemispheres. " Seaside Purslane."
Sen.: *Sieber* 19 ! *Boivin* ! Dakar, Hann beach (May) *Baldwin* 5754 ! **S.L.:** Mapotolon, Samu (Mar.) *Glanville* 251 ! Turtle Isl. (Nov.) *Deighton* 2395 ! **G.C.:** Sekondi (Oct.) *Howes* 980 ! Accra (May) *Irvine* 666 ! Also in other W. African coastal districts, but seldom collected. (See Appendix, p. 30.)

2. TRIANTHEMA Linn.—F.T.A. 2 : 587.

Leaves flat, mostly obovate or oblong-obovate :

Flowers solitary, partly enclosed by the sheathing leaf-base ; style 1 ; cap of fruit dehiscing in one piece 3–4 mm. in diam. ; leaves opposite or subopposite, anisophyllous, the larger leaf up to 3·5 cm. long and 1·5–3 cm. broad, distinctly petiolate, the lesser leaf much smaller ; stems sparsely pubescent or glabrous 1. *portulacastrum*

Flowers not enclosed by sheathing leaf-base ; styles 2 :

Flowers solitary ; seeds numerous ; cap of fruit conical, beaked, dehiscing in one piece ; leaves opposite or subopposite, elliptic or oblanceolate, obtuse, about 1·5 cm. long and 5–8 mm. broad .. .. 2. *polysperma*

Flowers 2–3 or more in axillary glomerules ; seeds few ; cap of fruit dehiscing in two pieces ; leaves opposite, only slightly anisophyllous, oblong-obovate, up to 5 cm. long and 2·5 cm. broad .. .. 3. *pentandra*

Leaves semi-terete, linear, fleshy, 5–10 mm. long, 2–3 mm. broad ; flowers 2–3 or more, in axillary glomerules ; style 1 ; cap of fruit discoid, about 1 mm. in diam. ; seeds 2, superposed, or solitary .. .. 4. *sedifolia*

1. **T. portulacastrum** *Linn.* Sp. Pl. 223 (1753) ; Chev. Fl. Viv. 1 : 331. *T. monogyna* Linn.—F.T.A. 2 : 587 ; Chev. Bot. 300. Rather fleshy, almost glabrous, prostrate herb ; sepals pink ; a weed of waste places.
Sen. & Fr.Sud.: *fide* Chev. *l.c.* **Gam.:** Genieri (July) *Fox* 113 ! **Iv.C.:** Mankono (June) *Chev.* 21961 ! **G.C.:** Cape Coast (July) *T. Vogel* 57 ! Accra (Feb.) *Dalz.* 69 ! Achimota (Aug.) *Irvine* 870 ! **Togo:** Lome *Warnecke* 317 ! **Fr.Nig.:** Niamey (Oct.) *Hagerup* 506 ! **N.Nig.:** Katagum (July) *Dalz.* 145 ! **S.Nig.:** Ibadan (Jan.) *Jones* FHI 4895 ! Widespread in tropical Africa, Asia and America. (See Appendix, p. 31.)

2. **T. polysperma** *Hochst. ex Oliv.* F.T.A. 2 : 588 (1871). Prostrate herb ; calyx green outside, pink or red within.
Fr.Sud.: Timbuktu (Aug.) *Hagerup* 255 ! Also in A.-E. Sudan.

3. **T. pentandra** *Linn.*—F.T.A. 2 : 588 ; Chev. Fl. Viv. 1 : 332 ; Melville in Kew Bull. 1952 : 263. Prostrate herb with stout stem ; flowers green.
Sen.: *Roger* 29 ! **Fr.Sud.:** Mopti (May) *Hagerup* 75 ! Timbuktu (July) *Chev.* 1303 ! **G.C.:** Accra (May) *Irvine* 1616 ! **Fr.Nig.:** *fide* Chev. *l.c.* **N.Nig.:** Borgu *Barter* 744 ! Katagum (July) *Dalz.* 146 ! Gashua (June) *Onochie* FHI 23368 ! Kukawa (Feb.) *E. Vogel* 52 ! 59 ! Kalkala *Golding* 44 ! Widespread in the drier parts of Africa, and in Arabia. (See Appendix, p. 30.)

4. **T. sedifolia** *Visiani*—F.T.A. 2 : 588 ; Chev. Fl. Viv. 1 : 333. Prostrate fleshy herb, forming clumps 1–2 ft. in diam. ; flowers reddish-green.
Fr.Sud.: Oualata *Jumelle* ! Also in the Sahara and the dry regions of N.E. Africa.

32. PORTULACACEAE

Herbs or undershrubs, often succulent ; leaves alternate or opposite, with scarious or setose stipular appendages. Flowers actinomorphic, hermaphrodite, solitary or variously cymose or racemose. Sepals 2, imbricate, free or united at the base. Petals 4–6, imbricate, free or connate at the base, soon falling. Stamens as many as and opposite the petals or more numerous, free ; anthers 2-celled. Ovary superior or half-inferior, 1-celled with basal placenta ; ovules 1 to many ; style usually variously divided. Fruit a capsule dehiscing by valves or by a transverse split (circumscissile), rarely a nut and indehiscent. Seeds globose-reniform ; embryo surrounding the copious mealy endosperm.

Widely spread in warmer regions, often occurring as weeds in cultivated places. Recognized by the succulent habit, 2 sepals, and the basal placentation.

Ovary superior ; capsule opening by valves ; seeds radiate-striate ; flowers in lax inflorescences .. .. 1. **Talinum**

Ovary half-inferior ; capsule opening by a transverse split (circumscissile) ; seeds verrucose ; flowers solitary or fascicled .. .. 2. **Portulaca**

1. TALINUM Adans.—F.T.A. 1 : 149 ; von Poellnitz in Fedde Rep. 35 : 1–34 (1934).

Flowers in a loose, forking, few-flowered panicle ; leaves obovate-lanceolate, emarginate and mucronate at apex, cuneate into petiole at base, 4–10 cm. long, 1·5–4 cm. broad, rather fleshy and glabrous; sepals ovate, acuminate, with 3 main green nerves, membranous on the margin ; petals about twice as long as the sepals ; capsule 5–6 mm. long, seeds radiate-striate 1. *triangulare*

Flowers in elongate racemes, or racemose panicles, with central axis erect and scarcely branched ; leaves entire and apiculate at apex ; otherwise similar to above 2. *portulacifolium*

1. **T. triangulare** (*Jacq.*) *Willd.*—von Poellnitz in Fedde Rep. 35 : 15 (1934) ; Chev. Fl. Viv. 1 : 340. *Portulaca triangularis* Jacq. (1760). *T. crassicaule* (Jacq.) Willd. (err. *crassifolium*)—F.T.A. 1 : 150. Erect herb with fleshy leaves, woody below ; flowers pink, rarely white ; capsule straw-coloured ; a naturalized weed, sometimes cultivated.
Sen.: Dakar *Chev.* 33842. **S.L.:** Regent (Apr.) *Sc. Elliot* 5790 ! Bendu, Jemmi (Apr.) *Deighton* 1726 ! **Iv.C.:** Assikasso (Dec.) *Chev.* 22577 ! **G.C.:** Aburi (Oct.) *Johnson* 235 ! *Howes* 1158 ! 1159 ! **Dah.:** Cotonou (Mar.) *Debeaux* 341 ! Abomey (Feb.) *Chev.* 23155 ! **S.Nig.:** Lagos (Apr.) *Moloney* ! Abeokuta *Barter* 3406 ! **Br.Cam.:** Ambas Bay (Apr.) *Hutch. & Metcalfe* 137 ! Introduced from tropical America and the West Indies. (See Appendix, p. 32.)

2. **T. portulacifolium** (*Forsk.*) *Asch. ex Schweinf.* in Bull. Herb. Boiss. 4, App. 2: 172 (1896). *Orygia portulacifolia* Forsk. (1775). *Portulaca cuneifolia* Vahl (1790). *T. cuneifolium* Willd.—F.T.A. 1 : 150 ; von Poellnitz l.c. 14. Stout perennial herb, woody below, to 3 ft. high ; flowers pink, rare in our area.
Sen.: (July–Aug.) *Heudelot* 461 ! Dakar (Sept., Oct.) *Ezanno* 66 ! *Chev.* 25259 ! 33836 ! 33842 ! **Togo:** Sodo *Doering* 137. **Nig.**: *fide* von Poellnitz *l.c.* Also from the Cameroons throughout Africa, from Abyssinia to the Cape, and in Arabia and India.

2. PORTULACA Linn.—F.T.A. 1 : 148 ; von Poellnitz in Fedde Rep. 37 : 240–320 (1934).

Stipules minute or obsolete ; leaves flat, spathulate-oblanceolate, rounded at apex ; flowers yellow .. .. 1. *oleracea*
Stipules thread-like and more or less persistent :
Stipular setae confined or almost confined to around the flowers ; leaves terete and succulent .. .. 2. *foliosa*
Stipular setae equally distributed along the branches :
Leaves linear ; flowers large, white or yellow to rose-red .. .. 3. *grandiflora*
Leaves lanceolate or ovate-lanceolate to obovate ; flowers smallish, yellow 4. *quadrifida*

1. **P. oleracea** *Linn.*—F.T.A. 1 : 148 ; von Poellnitz in Fedde Rep. 37 : 258 (1934) ; Chev. Fl. Viv. 1 : 337. Common annual ruderal, with spreading or prostrate succulent branches ; flowers bright yellow.
Sen.: Thies (Nov.) *Chev.* 2719. **Fr.Sud.**: Timbuktu (July) *Hagerup* 262 ! **S.L.**: Panbembu (July) *Thomas* 748 ! Kumrabai (Dec.) *Thomas* 6845 ! **Lib.**: *Harley* 94 ! **Iv.C.**: Beriby, on coast (Aug.) *Chev.* 20016. **G.C.**: Aburi (Oct.) *Johnson* 279 ! Accra (Mar.) *Deighton* 620 ! Achimota (May) *Irvine* 1615 ! **Dah.**: Agouagon (May) *Chev.* 23482. **N.Nig.**: Sokoto (Mar.) *Moiser* ! Liruwen-Kano Hills *Carpenter* ! Bauchi Plateau (July) *Lely* P. 511 ! **S.Nig.**: Lagos *Dawodu* 2 ! Ibadan (Apr.) *Meikle* 1446 ! Onitsha (May) *Onochie* FHI 7520 ! **F.Po**: *T. Vogel* 50 ! Very widespread in sandy waste places in warm climates. (See Appendix, p. 31.)

2. **P. foliosa** *Ker-Gawl.*—F.T.A. 1 : 148 ; von Poellnitz l.c. 304 ; Chev. Fl. Viv. 1 : 339. *P. prolifera* Schum. & Thonn.—Chev. l.c. 340. An erect or decumbent herb, often woody below ; flowers yellow, solitary or in small heads.
Sen., Fr.Sud., Fr.G., Iv.C. & Dah.: several localities *fide* Chev. *l.c.* **Fr.Sud.**: San (June) *Lean* 45 ! **G.C.**: N.T. (June) *Saunders* 10 ! Prampram (May) *Irvine* 1434 ! Achimota (Aug.) *Irvine* 855 ! **N.Nig.**: Nupe *Barter* 138 ! Jebba Isl. (Mar.) *Meikle* 1288 ! Lokoja (Mar.) *Parsons* 16 ! *Shaw* 39 ! Yola (Jan.) *Dalz.* 212 ! Idah (Sept.) *T. Vogel* 73 ! **S.Nig.**: Nun R. (Aug.) *T. Vogel* 32 ! Widespread in tropical Africa.

3. **P. grandiflora** *Hook.* in Bot. Mag. t. 2885 (1829) ; von Poellnitz l.c. 264. Stem diffuse with long pale hairs at the nodes ; leaves terete ; a weed around houses.
G.C.: Accra (Mar.) *Deighton* 618 ! **N.Nig.**: Abinsi (July) *Dalz.* 747 ! Native of S. America.

4. **P. quadrifida** *Linn.*—F.T.A. 1 : 149 ; von Poellnitz l.c. 275 ; Chev. Fl. Viv. 1 : 339. A prostrate or decumbent herb with pinkish stems and fleshy leaves very variable in shape and size, conspicuously woolly at the nodes ; flowers yellow. A common ruderal, but in Sierra Leone only seen in a few towns.
Sen.: *fide* Chev. *l.c.* **Fr.Sud.**: Timbuktu (Aug.) *Hagerup* 263 ! **S.L.**: Tiloma, near Jene (Dec.) *Deighton* 3896 ! **Lib.**: Gletown, Tchien (July) *Baldwin* 6902 ! **G.C.**: Accra (Mar.) *Deighton* 619 ! Mrenya, Ashanti (Apr.) *Irvine* 510 ! **Dah.**: *fide* Chev. *l.c.* **N.Nig.**: Lokoja *Barter* ! Katagum *Dalz.* 297 ! **S.Nig.**: Ibadan (Jan., Apr.) *Brenan* 9608 ! *Meikle* 1111 ! Waste places in warm countries.

33. POLYGONACEAE

Herbs, shrubs or climbers, rarely trees : leaves alternate, with the base of the petiole often dilated into a membranous sheath (*ochrea*). Flowers hermaphrodite, polygamous or dioecious, actinomorphic, small and inconspicuous. Sepals 3–6, imbricate, often enlarged and becoming membranous in fruit. Petals absent. Stamens usually 6–9, rarely more ; filaments free or united at the base ; anthers 2-celled, opening lengthwise. Disk annular or central. Ovary superior, sessile, 1-celled ; styles 2-4, usually free ; ovule solitary, basal, sessile or stalked. Fruit an indehiscent trigonous or 2-sided nut. Seeds with abundant mealy endosperm and often excentric embryo.

A cosmopolitan family. Recognized by the alternate simple leaves with sheathing ochrear stipules, small apetalous flowers, often persistent enlarged sepals, 1-celled 1-ovuled ovary, and endospermic seeds.

Flowers unisexual ; the male in lax panicles, with 20–30 stamens, inserted on a central disk ; inner female sepals enlarged, enclosing the fruit and becoming pyramidal and trigonous ; dioecious tree or shrub .. .. 1. **Symmeria**
Flowers hermaphrodite or polygamous ; stamens 5–8 ; inner sepals not as above :
Liane with tendrils ; leaves without a membranous sheath ; pedicels with a broad wing on each side, elongating in fruit .. .. .. 2. **Afrobrunnichia**
Herbs, erect or scandent, without tendrils ; leaves with a membranous sheath (ochrea) ; pedicels not winged :
Sepals unequal, the inner much enlarged and membranous in fruit ; ochrea not bristly ; leaves often cordate in our species :
Flowers 3-merous ; fruits without marginal setae, enclosed by the enlarged sepals 3. **Rumex**
Flowers 5-merous ; fruits with long barbed setae on the angles, longer than the enlarged sepals .. .. 4. **Harpagocarpus**

Sepals subequal ; flowers 5-(rarely 4-) merous ; fruits enclosed by the sepals ; ochrea often with long bristles at apex ; leaves never cordate in our species 5. **Polygonum**

Besides the above indigenous genera, *Antigonon leptopus* Hook. & Arn., a native of Mexico, is often met with; it is widely cultivated as an ornamental and is known as "Corallita."

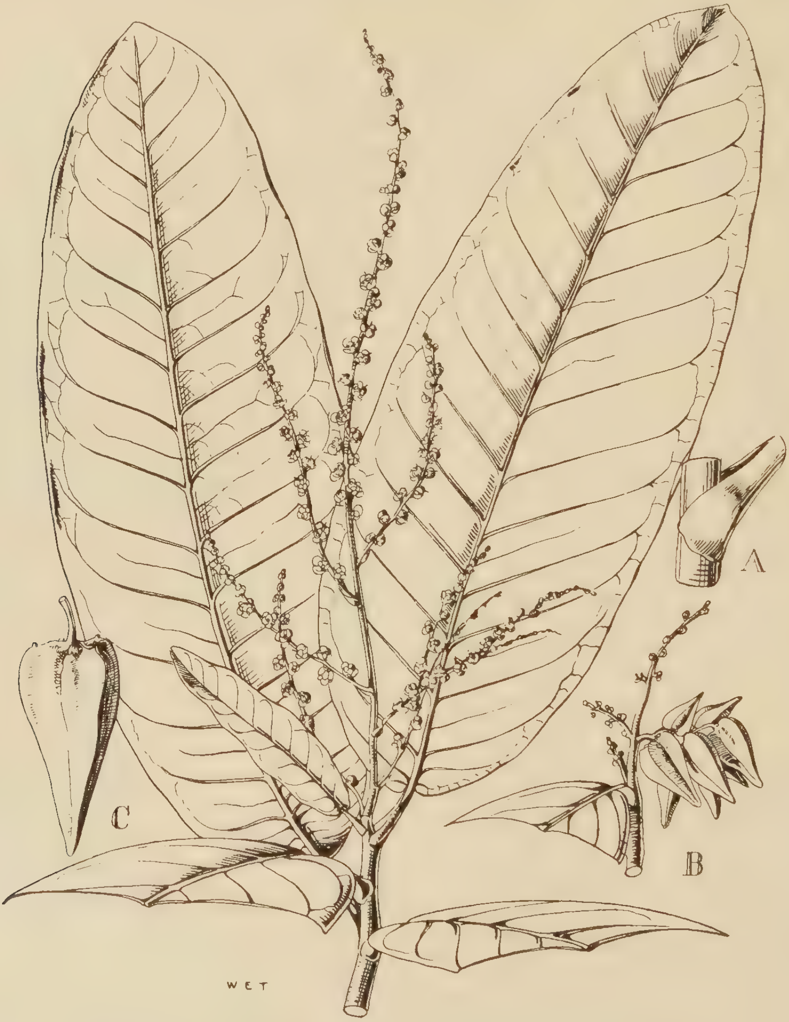

FIG. 49.—SYMMERIA PANICULATA *Benth.* (POLYGONACEAE).
A, base of petiole. B, flowering and fruiting branch. C, fruit.

1. SYMMERIA Benth.—F.T.A. 6, 1 : 118.

A dioecious tree or shrub ; leaves almost amplexicaul, elliptic, more or less cordate at base, rounded at apex, 15–20 cm. long, 6–9 cm. broad, with about 12 lateral nerves, reticulate on both surfaces ; petiole 1·5 cm. long, winged on the upper side, the wings overlapping ; male inflorescence minutely rusty-puberulous, up to about 20 cm. long, female inflorescence much smaller ; fruits enclosed by the enlarged trigonous calyx, about 1·5 cm. long and 0·8 cm. broad .. .. *paniculata*

S. paniculata *Benth.*—F.T.A. 6, 1 : 118. Small tree or shrub, to 20 ft. high, with wide trunk ; fruiting sepals yellow ; by river banks.
Sen.: *Heudelot* 334 ! **Fr.G.:** *Pobéguin* ! **S.L.:** Limba (Apr.) *Sc. Elliot* 5573 ! Kambia (Jan.) *Sc. Elliot* 4467 ! Laminaiya (fr. Apr.) *Thomas* 140 ! Njala (fr. Mar.–Apr.) *Deighton* 1907 ! *Small* 21 ! Also in British Guiana, Brazil and Venezuela.

2. **AFROBRUNNICHIA** Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 118 (1927) ; Kew Bull. 1928 : 28.

A woody climber by special tendriliform lateral branchlets ; branches terete or more or less ribbed and striate, glabrous ; leaves elliptic, caudate-acuminate, rounded or shortly cuneate at base, 6–10 cm. long, up to 6 cm. broad, glabrous ; petiole 1–1·5 cm. long ; pedicels broadly winged on each side, elongating in fruit up to 7 cm. long and 1·3 cm. broad ; fruits narrowly ovoid, about 1·5 cm. long including the persistent almost closed calyx-lobes .. .. *erecta*

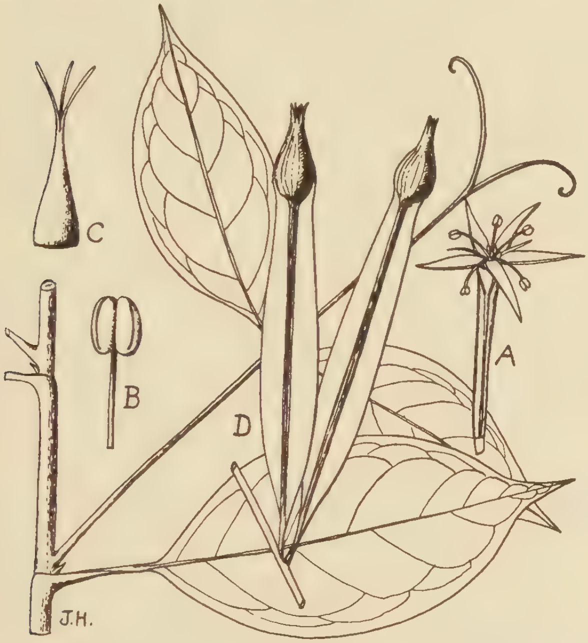

Fig. 50.—Afrobrunnichia erecta (*Asch.*) *Hutch. & Dalz.* (Polygonaceae).

A, flower.

B, stamen.

C, ovary with styles.

D, fruits.

A. erecta (*Asch.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 118 (1927) ; Kew Bull. 1928 : 28. *Brunnichia erecta* Asch.—F.T.A. 6, 1 : 119. *B. africana* Welw. var. *glabra* Dammer—F.T.A. 6, 1 : 119 ; Chev. Bot. 538. *B. africana* of Stapf in Johnston Lib. 644, not of Welw. Forest liane, to 50 ft. high ; calyx green, petals pink, fruits reddish-brown.

S.L.: near Giawahun (fr. Apr.) *Deighton* 3663 ! Vaama, Barri (Dec.) *Deighton* 3798 ! Jama (fr. Mar.) *Deighton* 4722 ! **Lib.**: Kakatown *Whyte* ! Moylakwelli (Oct.) *Linder* 1272 ! Gbanga (fr. Dec.) *Baldwin* 10551 ! **Iv.C.**: *fide* Chev. *l.c.* **G.C.**: Axim *Burton* ! Bompata (fr. Dec.) *Dalz.* 112 ! R. Birrim, Oda (Jan.) *Darko* 501 ! Bobiri F. R. (fr. Jan.) *Andoh* FH 5461 ! **S.Nig.**: Ijan, Lagos (fr. Jan.) *Millen* 140 ! Okomu F.R. (fr. Feb.) *Brenan* 9030 ! Oban *Talbot* ! Aboabam (Dec.) *Keay* FHI 28174 ! Also in French Cameroons, Gabon and Belgian Congo.

3. **RUMEX** Linn.—F.T.A. 6, 1 : 114.[1]

Leaves hastate, more or less triangular, acuminate, 6–15 cm. long, up to 15 cm. broad ; flowers in large much-branched panicles ; persistent perianth segments entire, membranous, reticulate .. .. 1. *abyssinicus*

Leaves lanceolate, more or less narrowed at base, never hastate, up to 30 cm. long and 5 cm. broad ; persistent perianth segments with pectinate hooked teeth 2. *bequaerti*

1. **R. abyssinicus** *Jacq.*—F.T.A. 6, 1 : 114. Herb with stout perennial rootstock, 1 in. diam. ; stems annual, up to several feet high.

N.Nig.: Bauchi Plateau (May) *Lely* P. 251 ! Hepham to Ropp (fl. & fr. July) *Lely* 367 ! **Br.Cam.**: Buea (fr. Jan.) *Maitland* 297 ! Cam. Mt., 4,000–7,600 ft. (fl. & fr. Nov.–Jan.) *Mann* 1217 ! 1978 ! *Maitland* 968 ! 1289 ! Bamenda, 5,500 ft. (fr. Jan.) *Migeod* 404 ! Widespread in East, Central and South tropical Africa, and in Madagascar.

2. **R. bequaerti** *De Wild.* Pl. Bequaert. 5 : 2 (1929) ; Robyns in Fl. Congo Belge 1 : 400. *R. nepalensis* of F.T.A. 6, 1 : 117 and F.W.T.A., ed. 1, 1 : 120, not of Spreng. Perennial herb, with stems 3–6 ft. high.

Br.Cam.: Cam. Mt., 5,800–9,000 ft. (fl. & fr. Nov.–Jan.) *Mann* 1235 ! 1990 ! *Maitland* 825 ! 967 ! 1276 ! Bamenda, 5,000 ft. (fl. & fr. Jan.–Mar.) *Maitland* 1614 ! *Migeod* 307 ! Widespread in East, Central and South tropical Africa, and in Madagascar and S. Africa.

4. **HARPAGOCARPUS** Hutch. & Dandy in Kew Bull. 1926 : 363.

Scandent or weakly erect herb ; leaves sagittate, the lower ones ovate-triangular up to 8 cm. long and 3 cm. broad, the upper linear-lanceolate ; petiole slender, up to 5 cm. long ; flowers in slender terminal and axillary racemes up to 15 cm. long ;

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[1] I am much indebted to K. H. Rechinger of Vienna for assistance and advice in revising this genus for this edition.—R.W.J.K.

flowers 1 or 2 together ; sepals 5, obovate, unequal, up to 3·5 mm. long and 2·5 mm. broad ; ovary and fruit trigonous, fruit about 8 mm. long, with 2 mm. long setae on the angles, setae barbed at the tip with several backwards-directed barbs arranged in a radiate manner .. .. *snowdenii*

H. snowdenii *Hutch. & Dandy* in Kew Bull. 1926 : 363, with fig. *Fagopyrum ciliatum* Jac.-Fel. in Bull. Mus. Hist. Nat. 18 : 409 (1946). A " *Rumex*-like " plant, weakly erect or scandent, to 3 ft. high ; flowers green ; fruits with red or purple barbed setae.
Br.Cam.: Bamenda Prov.: Lakom, 6,000 ft. (Apr.) *Maitland* 1491 ! Basenako, 5,000 ft. (June) *Maitland* 1503 ! Ndu, 6,400 ft. (Jan.) *Keay* FHI 28441 ! Also in French Cameroons, Belgian Congo, Uganda and Tanganyika.

5. **POLYGONUM** Linn.—F.T.A. 6, 1 : 103 ; A. N. Steward in Contrib. Gray Herb. Harv. 88 (1930).

Flowers arranged in axillary clusters or small heads ; stems more or less prostrate :

Leaves oblong or linear-oblong, subsessile, acute, 5–10 mm. long, 2–3 mm. broad, with revolute margins ; ochrea more or less lacerate, white ; flowers solitary or in axillary clusters ; nutlet smooth and shining .. .. 1. *plebeium*

Leaves ovate, about 1·5–2 cm. long and 1–1·5 cm. broad, narrowed into a winged petiole ; ochrea entire, brownish ; flowers in pedunculate clusters ; nutlets closely pitted .. .. 2. *nepalense*

Flowers arranged in spike-like racemes or panicles :

Ochrea with a spreading or recurved herbaceous ciliate limb, long-pilose on the outside ; leaves linear-lanceolate, up to 10 cm. long and 2 cm. broad, pubescent on nerves beneath or glabrous ; racemes densely flowered .. .. .. 3. *limbatum*

Ochrea without a spreading limb :

Racemes very short, not more than 2 cm. long, borne on a dichotomously branched, glandular-pubescent rhachis ; stems with recurved hairs or glabrous ; ochrea membranous, glabrous except for the shortly ciliate apex ; leaves lanceolate, cuneate at base, acute at apex, up to 15 cm. long and 2·5 cm. broad
4. *strigosum* var. *pedunculare*

Racemes elongated, much exceeding 2 cm. long :

Leaves densely pilose, or woolly beneath :

Leaves white and woolly beneath with the hairs closely matted together ; leaves lanceolate, 10–30 cm. long, 2–5 cm. broad, narrowed at base into a 2–4 cm. long petiole, acutely acuminate at apex ; cilia at apex of ochrea absent or very small and weak .. .. 5. *lanigerum* var. *africanum*

Leaves silky-pilose beneath, the hairs not closely matted together ; leaves linear-lanceolate to lanceolate, 8–25 cm. long, 1–5 cm. broad, petiole up to 1 cm. long ; cilia at apex of ochrea very long and conspicuous .. .. 6. *pulchrum*

Leaves glabrous or rather sparingly pubescent beneath :

Ochrea without, or with very small and few, cilia at apex, 3–4 cm. long ; leaves elongate ovate-lanceolate, about 15–20 cm. long and 3–5 cm. broad, long-cuneate at base, long-acuminate at apex, glandular-punctate on both surfaces, glutinous, more or less shortly appressed pubescent especially on midrib and nerves, margins ciliate .. .. 7. *senegalense*

Ochrea with distinct long cilia at apex ; leaves not glandular punctate and glutinous:

Leaves glabrous beneath except on the margin and midrib, linear-lanceolate, up to 15 cm. long and 1·5 cm. broad, rather abruptly narrowed into the short petiole ; inflorescence lax and slender, flowers not densely crowded ; nutlets trigonous .. .. 8. *salicifolium*

Leaves pubescent beneath ; inflorescence with rather dense clusters of flowers ; nutlets usually lenticular :

Peduncles glabrous or glabrescent ; leaves lanceolate to ovate-lanceolate, 6–18 cm. long, 2–5 cm. broad, appressed pubescent beneath with crisped hairs
9. *nyikense*

Peduncles appressed pubescent ; leaves linear-lanceolate to lanceolate 8–18 cm. long, 1–3·5 cm. broad, appressed pubescent beneath with straight hairs
10. *acuminatum*

1. **P. plebeium** *R.Br.*—F.T.A. 6, 1 : 105 ; Chev. Bot. 537. Much-branched prostrate herb of dry regions ; flowers pinkish-red or white ; a very variable species.
Sen.: *Roger* 16 ! **Fr.Sud.:** Sikasso (Apr.) *Chev.* 749 ! Mopti *Hagerup* 70 ! Diafarabé (May) *Lean* 24 ! **N.Nig.:** Katsina (Apr.) *Meikle* 1365 ! Widely distributed in the drier parts of Africa and tropical Asia ; and in Australia.

2. **P. nepalense** *Meisn.* Monogr. Polygon. 84 (1826) ; Steward in Contrib. Gray Herb. Harv. 88 : 74 (1930). *P. punctatum* var. *alatum* Buch.-Ham. ex D. Don (1825). *P. alatum* (Buch.-Ham. ex D. Don) Spreng. (1827) ; F.T.A. 6, 1 : 104 ; F.W.T.A., ed. 1, 1 : 120. Annual, by streams in forest ; flowers white.
F.Po: 7,500 ft. (Apr.) *Mann* 1449 ! Moka (Jan.) *Exell* 772 ! Also in central and east tropical Africa, Madagascar and eastern Asia.

3. **P. limbatum** *Meisn.*—F.T.A. 6, 1 : 108 ; Chev. Bot. 537. Perennial, 3–4 ft. long, more or less ascending ; in swamps and ditches.
Fr.Sud.: Sébi to Mopti (Aug.) *Chev.* 3459! **Fr.Nig.:** Zinder (Oct.) *Hagerup* 580 ! **N.Nig.:** Suri, Sokoto (July) *Bakare* FHI 5181 ! Katagum (Sept.) *Dalz.* 149 ! Komadugu Waube, Bornu (Dec.) *Elliott* 140 ! Widespread in tropical Africa, and in Egypt and India.

4. **P. strigosum** *R. Br.* var. **pedunculare** (*Wall. ex Meisn.*) *Steward* l.c. 91 (1930). *P. pedunculare* Wall. ex Meisn. —F.T.A. 6, 1 : 107 : F.W.T.A., ed. 1, 1 : 120 ; Chev. Bot. 537. Annual herb, erect or semi-decumbent.
Fr.G.: Dalaba, Diaguissa, 3,500–4,000 ft. (Oct.) *Chev.* 18798. **N.Nig.:** Bauchi Plateau (Sept.) *Lely* P. 734 ! Widespread in tropical Africa, Asia and Australia.

5. **P. lanigerum** *R.Br.* var. **africanum** *Meisn.* in DC. Prod. 14 : 117 (1856). *P. lanigerum* of F.T.A. 6, 1 : 109 ; F.W.T.A., ed. 1, 1 : 120 ; Chev. Bot. 537. Stout perennial, 5–6 ft. long ; aquatic.
Gam.: *Ingram* ! **Fr.Sud.:** Mopti (May) *Hagerup* 71 ! Diafarabé (Sept.) *Lean* 99 ! Berra (Nov.) *De Wailly* 4863 ! **Fr.G.:** Kankan (Mar.) *Chev.* 591 ! R. Niger, Dantilia *Sc. Elliot* 5265 ! **S.L.:** R. Waanje, Dama (Jan.) *Adames* 8 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** R. Afram (Jan.) *Irvine* 610 ! Tamale (Nov.) *Williams* 400 ! **N.Nig.:** Sokoto (Oct.) *Moiser* 119 ! *Lely* 106 ! Bauchi Plateau (Jan., June) *Lely* 323 ! P. 133 ! L. Chad. (Dec.) *Elliott* 156 ! *Talbot* 1498 ! **S.Nig.:** Olokemeji (Dec.) *Latilo* FHI 14654 ! Aboh *Barter* 175 ! Throughout tropical and S. Africa ; the species also occurs in N. Australia, but the Asiatic plant previously referred to *P. lanigerum* is regarded by Steward (l.c. 46) as *P. lapathifolium* Linn. var. *lanatum* (Roxb.) Steward. (See Appendix, p. 32).

6. **P. pulchrum** *Blume* Bijdr. 9 : 530 (1825); Robyns in Fl. Congo Belge 1 : 419. *P. tomentosum* Willd. (1799)—F.T.A. 6, 1 : 110 ; Chev. Bot. 538 ; F.W.T.A., ed. 1,1 : 120 ; Steward l.c. 49 ; not of Schrank (1789). Perennial with long rhizome ; stems 4–5 ft. long ; in swamps and by rivers.
S.L.: Kambia (Dec.) *Deighton* 902 ! Fawkaw, Great Scarcies (Apr.) *Glanville* 256 ! Messima (Apr.) *Adames* 32 ! Rokupr (Apr.) *Adames* 178 ! **G.C.:** Essiama *Fishlock* 89 ! **Togo:** Kpedsu (Feb.) *Howes* 1126 ! **Dah.:** *fide* Chev. *l.c.* **S.Nig.:** Lagos *Moloney* ! Nun R. (Sept.) *Mann* 493 ! Okomu F. R. (Dec.) *Brenan* 8586 ! Widespread in tropical Africa and Asia. (See Appendix, p. 32.)

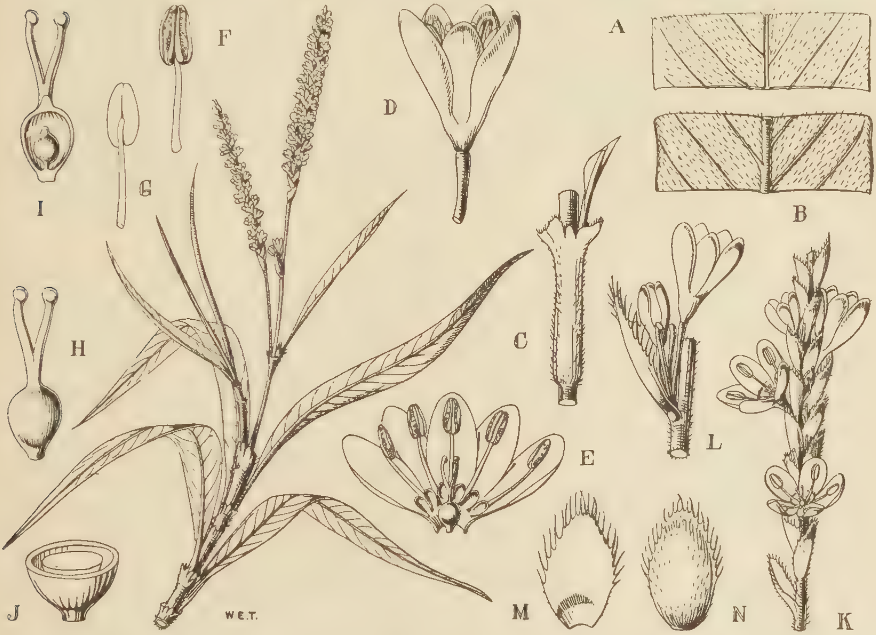

FIG. 51.—POLYGONUM LIMBATUM *Meisn.* (POLYGONACEAE).

A, portion of leaf, upper surface. B, lower surface of same. C, ochrea. D, flower. E, flower laid open. F, G, stamens, front and back. H, ovary with styles. I, vertical section of ovary. J, cross-section of ovary. K, portion of inflorescence. L, portion of same, enlarged. M, N, bracts, inner and outer face.

7. **P. senegalense** *Meisn.*—F.T.A. 6, 1 : 111 ; Chev. Bot. 537. *P. glabrum* of F.T.A. 6, 1 : 113 ; F.W.T.A., ed. 1, 1 : 120 ; Chev. Bot. 537 ; not of Willd. Perennial, erect or semi-decumbent, 3–9 ft. high, in river-beds, swamps, etc. ; flowers pink and white.
Sen.: *Roger* 21 ! *Döllinger* ! **Gam.:** *Pirie* 43 ! **Fr.Sud.:** Fafa *Hagerup* 426 ! **G.C.:** Aburi (Sept.) *Johnson* 1080 ! **Fr.Nig.:** Niamey to Gao *Ryff* ! **N.Nig.:** Sokoto (Nov.) *Moiser* 223 ! Katagum (July) *Dalz.* 150 ! Bauchi Plateau (May) *Lely* 226 ! R. Kaduna, Bida (Mar.) *Meikle* 1327 ! **S.Nig.:** Badagry (Dec.) *Don* ! R. Ogun, Lagos *Millen* 136 ! Throughout tropical Africa and in Egypt. [*P. glabrum* Willd. of Asia is very similar but has absolutely glabrous leaves with eciliate margins.] (See Appendix, p. 32.)

8. **P. salicifolium** *Brouss. ex Willd.* Enum. Pl. Hort. Berol. 428 (1809). *P. serrulatum* Lag. (1816)—F.T.A. 6, 1 : 107 ; F.W.T.A., ed. 1, 1 : 120 ; Chev. Bot. 537. *P. barbatum* of Chev. Bot. 536, not of Linn. Annual, 3–4 ft. long, erect or semi-decumbent ; flowers pink and white ; in marshy places.
Sen.: *Roger* ! *Döllinger* ! **Gam.:** Kuntaur *Ruxton* 95 ! **Fr.Sud.:** *fide* Chev. *l.c.* **Fr.G.:** Kouroussa (July) *Pobéguin* 343 ! **S.L.:** Kambia (Dec.) *Sc. Elliot* 4352 ! *Deighton* 843 ! Port Loko (Dec.) *Thomas* 5838 ! Rokupr (Mar.) *Adames* 163 ! **Lib.:** R. Cess, Tchien (Aug.) *Baldwin* 9007 ! Vonjama (Oct.) *Baldwin* 9866 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** R. Ancobra (Jan.) *Irvine* 1082 ! **Togo:** Kpandu *Robertson* 41 ! **N.Nig.:** Sokoto (Sept.) *Moiser* ! Nupe *Barter* 1551 ! Ilorin (Aug.) *Thornton* ! Bauchi Plateau (Jan., May, July) *Lely* 365 ! 430 ! P. 132 ! P. 260 ! **S.Nig.:** Lagos *Rowland* ! Akinjare, Owo (Apr.) *Jones* FHI 3121 ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 762 ! Bali, Bamenda (May) *Ujor* FHI 30387 ! Widespread in the tropics and S. Europe.

9. **P. nyikense** *Bak.* in Kew Bull. 1897 : 280. *P. acuminatum* of F.T.A. 6, 1 : 112, partly. Perennial herb, decumbent below, to 3 ft. high.
Br.Cam.: Cam. Mt., 4,400 ft. (Apr.) *Maitland* 1115! **F.Po:** *Guinea* 1600! Moka (Jan.) *Exell* 793! Widespread in central and east Africa, extending to Nyasaland. [An unmatched specimen from Bamenda (*Tamajong* FHI 23456) is near this, but has distinctive long narrow inflorescences ; further material may show this to be a distinct species.]

10. **P. acuminatum** *H.B. & K.*—F.T.A. 6, 1 : 112. *P. barbatum* of F.T.A. 6, 1 : 109, partly, not of Linn. Perennial, erect or semi-decumbent, 3–4 ft. high ; in moist places.
S.L.: Falaba (Mar.) *Sc. Elliot* 4454! R. Scarcies (Jan.) *Sc. Elliot* 4498! R. Bum-Kittam, Gbap (Sept.) *Fisher* 1767! Laminaiya (Apr.) *Thomas* 139! **G.C.:** Tamale (Nov.) *Williams* 403! **N.Nig.:** Nupe *Barter* 874! S. Kano (Dec.) *Thornewill* 147! Bauchi Plateau (May, July) *Lely* 200! P. 371! L. Chad *Talbot* 695! Yola (Mar.) *Dalz.* 209! **S.Nig.:** Olokemeji (Aug.) *Foster* 338! Onitsha (Feb.) *Jones* FHI 720! Widespread in tropical and S. Africa and in tropical America.

The field worker should look out for possible hybrids which sometimes occur in this genus.

In addition to the above, *P. baldschuanicum* Regel, a native of central Asia, is sometimes cultivated in our area.

34. ILLECEBRACEAE

Herbs, rarely subshrubs. Leaves mostly opposite, small, simple, often connate at the base, mostly entire ; stipules scarious, simple or connate, rarely absent. Flowers small, herbaceous, green or white, often with scarious bracts, mostly hermaphrodite, actinomorphic. Calyx herbaceous or leathery, persistent, 4–5-lobed or parted, lobes imbricate. Petals absent or sometimes replaced by small staminodes. Stamens the same number as and opposite the calyx-lobes, rarely fewer or more, mostly perigynous ; filaments free or connate at the base into a ring ; anthers 2-celled, opening lengthwise. Ovary free, sessile, 1-celled ; style 1, terminal, or styles 2–3 ; ovule 1, rarely 2, erect or pendulous from a basal funicle. Fruit a utricle or nut, mostly indehiscent, 1-seeded, included by the calyx. Seed with copious or small endosperm ; embryo annular to straight.

CORRIGIOLA Linn.—F.T.A. 6, 1 : 12.

Perianth herbaceous 5-partite, segments oblong, obtuse. Stamens 5, perigynous, alternating with 5 scale-like staminodes. Ovary ovoid ; style very short ; stigmas 3 ; ovule 1, amphitropous, suspended from a basal funicle. Fruit an indehiscent crustaceous nutlet enclosed in the persistent perianth. Seed subglobose, pendulous ; embryo annular.

Annual or biennial, stems 3–6 cm. long, close to the ground, forming a clump 6–12 cm. diam. ; leaves alternate, closely arranged, oblong, 2–2·5 mm. long, 1 mm. broad, narrowed at base into a petiole scarcely 0·5 mm. long ; stipules scarious, very small ; flowers in congested cymes in the axils of the upper leaves, about 0·7 mm. diam. ; borne on pedicels 0·3–0·5 mm. long ; fruit about 1 mm. diam. .. *russelliana*

C. russelliana *A. Chev.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 1008 (1932) ; Pax & Hoffmann in E. & P. Pflanzenfam. 16C : 299 (1934) ; Chev. Fl. Viv. 1 : 316.
Sen.: R. Diorbivol *Trochain* 2914. **Fr.Sud.:** Niala, Djenne (fl. & young fr. June) *Chev.* 1131. R. Bani, Djenne *Chev.* 42945 ; s.n.!

35. PHYTOLACCACEAE

Herbs, shrubs or trees. Leaves alternate, entire ; stipules absent or minute. Flowers hermaphrodite or unisexual, actinomorphic or nearly so, hypogynous, in simple or compound terminal or axillary racemes. Perianth simple, herbaceous or coriaceous. Sepals free or some connate, imbricate, equal or unequal. Petals absent. Stamens 3 to many, often inserted on a hypogynous disk ; filaments free or slightly connate at the base ; anthers 2-celled, cells parallel and dehiscing longitudinally. Ovary superior, composed of 1 or several carpels either free or variously connate ; style almost none or short ; ovule solitary in each carpel, basal. Fruit of 1 or many carpels, fleshy or dry. Seed erect, with the large embryo in the periphery and enclosing the endosperm.

Liane, dioecious ; sepals equal ; carpels usually 5, connate at base ; fruit fleshy, usually 5-lobed .. .. 1. **Phytolacca**
Erect herb, flowers hermaphrodite ; sepals unequal, the lower one the largest ; carpel 1 ; fruit dry .. .. 2. **Hilleria**

Petiveria alliacea Linn., a herb from the West Indies and tropical America, occurs at Lagos and Olokemeji in Nigeria as a casual. (See Appendix, p. 33.)

1. PHYTOLACCA Linn.—F.T.A. 6, 1 : 96.

Dioecious liane ; older branches marked with prominent callous leaf-scars ; leaves elliptic or ovate-elliptic, shortly cuneate or rounded at base, acute or acuminate at apex, 4–15 cm. long, 2–10 cm. broad, thinly papery, glabrous, petiole 1–5 cm. long ;

racemes slender up to 40 cm. long, pedicels 2–12 mm. long ; male flowers with about 15 stamens up to 5 mm. long ; female flowers with short rudimentary stamens, carpels usually 5, connate at base ; fruits usually 5-lobed, about 5 mm. diam. *dodecandra*

P. dodecandra *L'Hérit.*—F.T.A. 6, 1 : 97 ; H. Walt. in Engl. Pflanzenr. Phytolacc. 42 ; Chev. Bot. 536. Scandent shrub or liane, to 50 ft. high ; male flowers white or yellowish-green, in numerous conspicuous racemes ; ripe fruits red.

Fr.G.: Labé *Pobéguin* 2041 ! **S.L.:** Talla Hills (Feb.) *Sc. Elliot* 4827 ! **Iv.C.:** Haut-Cavally (May) *Chev.* 21392. **G.C.:** Larte (Jan.) *Johnson* 173 ! **S.Nig.:** Lagos *Millen* 62 ! Ibadan (fr. Mar.) *Meikle* 1271 ! Ife (Dec.) *Keay* FHI 22461 ! Benin (Nov.) *Ejiofor* FHI 24650 ! Degema *Talbot* 3800 ! **Br.Cam.:** Lakom, Bamenda (Mar.) *Johnstone* 98/31 ! Widespread in tropical and S. Africa, and in Madagascar. (See Appendix, p. 33.)

Two incomplete specimens which may prove to be two other species of *Phytolacca* have been collected at Gama, Sierra Leone (*Deighton* 4384) and at Buea, British Cameroons (*Maitland* 547).

The plant recorded as *P. octandra* Linn. in F.T.A. 6, 1 : 98 is *Sphenoclea zeylanica* Gaertn.

2. HILLERIA Vell.—F.T.A. 6, 1 : 95, as *Mohlana* Mart.

Herb up to 1 m. high ; leaves ovate-elliptic, obtuse or subacute at the base, acutely acuminate, up to 15 cm. long and 6 cm. broad, entire, with numerous short lines of crystals resembling appressed hairs on the lower surface ; lateral nerves about 6 on each side ; petiole long, with setulose hairs on the upper side ; racemes slender, up to about 12 cm. long ; fruit ellipsoid-globose, about 2 mm. in diam., reticulate, glabrous .. .. *latifolia*

H. latifolia (*Lam.*) *H. Walt.* in Engl. Pflanzenr. Phytolacc. 81, t. 25 (1909). *Rivina latifolia* Lam. (1791). *Mohlana nemoralis* Mart.—F.T.A. 6, 1 : 95 ; Chev. Bot. 535. *M. guineensis* Moq.—Chev. Bot. 535. Perennial herb, often woody below ; corolla white in a yellow or pinkish raceme ; fruits yellow or orange, then deep purplish-black. Naturalized in cultivated ground and along forest paths near villages in the forest regions.

Lib.: Webo Dist. (July) *Baldwin* 6236 ! 6603 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kumasi *Cummins* 54 ! Aburi (Apr.) *Brown* 324 ! Achimota (Aug.) *Irvine* 12 ! **Togo:** Lome *Warnecke* 427 ! **S.Nig.:** Lagos *Millen* 92 ! Olokemeji (Apr.–July) *Foster* 283 ! *MacGregor* 296 ! Sapoba (May) *Kennedy* 1413 ! Oban *Talbot* 661 ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 775 ! Kumba (Apr.) *Hutch. & Metcalfe* 160 ! A native of S. America, naturalized in many parts of tropical Africa and Mascarene Islands. (See Appendix, p. 32.)

36. CHENOPODIACEAE

By J. P. M. Brenan

Mostly annual or perennial herbs, sometimes shrubs, rarely small trees, often halophytic and with tendency to fleshiness. Leaves alternate, rarely opposite, simple, without stipules, entire or not, but characteristically never regularly serrate ; sometimes the leaves reduced to scales. Flowers small to minute, mostly green to grey, solitary and axillary, or more often variously clustered, usually regular, hermaphrodite or unisexual. Calyx (1-) 2–5-lobed, lobes more or less united below, imbricate or almost valvate, persistent after flowering, or variously modified in fruit. Petals absent. Stamens as many as or fewer than sepals, and opposite them. Ovary normally free and superior, one-celled. Stigmas 2(–5). Ovule solitary, campylotropous, on a long or short almost always basal funicle. Fruit usually utricular, indehiscent, rarely circumscissile, often included in and falling with the calyx. Embryo peripheral, curved, annular or spiral, surrounding the endosperm, which may be absent.

Mostly weeds, or desert or maritime plants often with fleshy leaves or apparently jointed fleshy stems ; flowers usually very small and inconspicuous ; embryo curved, usually surrounding the endosperm. Material of most of the West African genera is inadequate or lacking at Kew. Dried specimens of the fleshy genera should be supplemented by portions of the flowering branches in spirit, and by careful notes on habit and colour of the plants.

Leaves with flat and fairly large blade, distinctly petiolate, glandular or mealy on the surface .. .. 1. **Chenopodium**
Leaves small, linear, cylindrical, short and triangular or globose, or else the stem and branches appearing jointed, the leaves apparently absent :
  Stem and branches not appearing as if built up of succulent jointed sections :
    Leaves cylindrical or subcylindrical ; calyx not winged in fruit, flowers not in dense spikes .. .. 2. **Suaeda**
    Leaves triangular to subglobose, short :
      Calyx with spreading membranous wings in fruit ; plant more or less pubescent, at least on youngest shoots .. .. 3. **Salsola**
      Calyx not winged in fruit ; plant glabrous.. .. .. .. 4. **Halopeplis**
  Stem and branches apparently built up of succulent green to reddish jointed sections which ultimately shrivel and fall away, each joint derived from the connate sheathing bases of a pair of opposite leaves whose lamina is absent ;

Seeds glabrous ; flowers in each group of three not fused with each other, more or less tubular, their calyces not conspicuously flattened at apex ; embryo comma-shaped, along one side of the seed ; endosperm copious, lateral .. 5. **Arthrocnemum**

Seeds shortly hairy ; flowers in each group of three more or less connate, their calyces flattened at apex ; embryo folded like a closed U, filling the seed ; endosperm absent or almost so .. .. 6. **Salicornia**

1. CHENOPODIUM Linn.—F.T.A. 6, 1 : 77.

Plant more or less mealy, at least on young parts, with grey or whitish vesicular hairs, not aromatic, other sorts of hair and also glands absent ; ripe seeds black when ripe, 1·2–1·5 mm. diam., acutely keeled .. .. 1. *murale*

Plant variably pubescent, and with yellow to amber glands, strongly aromatic, vesicular hairs absent ; ripe seeds red-brown to blackish, 0·5–1·25 mm. diam., bluntly keeled 2. *ambrosioides*

1. **C. murale** *Linn.*—F.T.A. 6, 1 : 78 ; Trochain Contrib. Étude Vég. Sénégal 367 (1940). Annual normally much-branched herb up to 3 ft. high, with mostly rhombic-ovate leaves and minute greenish flowers in divaricately branched leafy cymes.
Sen.: *fide* Trochain *l.c.* Widespread both in the tropics and in temperate countries.

2. **C. ambrosioides** *Linn.*—F.T.A. 6, 1 : 79. Annual, sometimes perennial herb to 4 ft. high, with mostly lanceolate leaves and an ample panicle with small sessile flower-clusters arranged spicately along the ultimate branches.
Sen.: Cayor *Poisson* ! **G.C.:** Aduamoa, Kwahu (Jan.) *Irvine* 1725 ! **S.Nig.:** Olokemeji (Feb.) *Dodd* 412 ! **Br.Cam.:** Buea (Oct.) *Maitland* 113 ! Native of S. America, now widespread as a weed, except in cold countries.

Imperfectly known species.

C. sp. Apparently herbaceous, glabrous except for yellowish-white vesicular hairs, especially on young parts ; leaves narrowly elliptic in outline, sinuate-lobate, about 1·5–3 cm. long ; flowers in small axillary clusters, only female known ; sepals 4, vesicular-hairy, bluntly keeled near apex ; seed vertical 1 mm. in diameter, somewhat compressed laterally.
Br.Cam.: Nchan, Bamenda, " about cultivation " (Apr.) *Maitland* 1512 !

This is no previously known species of *Chenopodium* ; more material, especially to show the other sex, is much needed.

2. SUAEDA Forsk.[1] ex Scop. Introd. Hist. Nat. 333 (1777) ; F.T.A. 6, 1 : 91.

Shrubby perennial ; leaves obtuse at apex, abruptly contracted at base ; stigmas 3 ; seeds mostly vertical .. .. 1. *fruticosa*

Annual ; leaves tapering and acute at apex, not abruptly contracted at base, stigmas 2 ; seeds horizontal .. .. 2. *maritima*

1. **S. fruticosa** *Forsk. ex J. F. Gmel.* Syst. Nat., ed. 13, 2 : 503 (1791) ; Forsk. Fl. Aegypt.-Arab. 70 (1775), *nomen illegitimum* ; Trochain Contrib. Étude Vég. Sénégal 116, 384 (1940) ; Clapham, Tutin & Warburg Fl. Brit. Isl. 360 (1952). Erect or ascending, up to 4 ft. ; leaves succulent, 4–11 (–18) mm. long, about 1 mm. wide, almost cylindrical ; flowers axillary, sessile, one to few together.
Sen.: St. Louis Gandiole region, by lagoons near the shore *fide* Trochain *l.c.* Coasts of Europe (including Britain) and the Mediterranean region, extending to Asia, Australia and N. America ; in Africa southwards to S. Africa.

2. **S. maritima** (*Linn.*) *Dumort* Fl. Belg. 22 (1827) ; Trochain l.c. 114, 384, t. 4, photo 366 (1940) ; Clapham, Tutin & Warburg l.c. 359 (1952). *Chenopodium maritimum* Linn. Sp. Pl. 221 (1753). Prostrate to erect, up to about 2 ft. high ; leaves often wider than in *S. fruticosa*, otherwise the two species rather similar.
Sen.: L. Retba *fide* Trochain *l.c.* Widespread along sea coasts.

3. SALSOLA Linn.—F.T.A. 6, 1 : 87.

Branchlets slender with distinct internodes, pubescent at first, becoming glabrous ; leaves alternate, very small, triangular or ovoid, pubescent or glabrous, thinner at the margin ; flowers crowded on short lateral branchlets, all forming a straggly panicle ; calyx-segments with a spreading membranous wing on the back in fruit 1. *baryosma*

Branchlets rather stout, closely hairy ; leaves opposite, crowded, broadly triangular, thick, densely and softly tomentose ; flowers forming spikes at the ends of the branchlets ; calyx-segments as above .. .. 2. *tetrandra*

1. **S. baryosma** (*Schult.*) *Dandy* in F. W. Andr. Fl. Pl. A.-E. Sudan 1 : 111 (1950). *Chenopodium baryosmon* Schult. Syst. 6 : 269 (1820). *S. foetida* Del. ex Spreng. Syst. 1 : 925 (1825), not of Pall. ex Vest in Schult. Syst. 6 : 238 (1820). *S. vermiculata* var. *microphylla* of F.T.A. 6, 1 : 88, not of Moq. *S. brevifolia* of F.W.T.A., ed. 1, 1 : 123, not of Desf. A much-branched undershrub 1–4 ft. high.
Sen.: Sor Isl. *Roger* ! **Fr.Sud.:** Oualata region *Jumelle* ! Also in N. Africa, and extending eastwards to India.

2. **S. tetrandra** *Forsk.* Fl. Aegypt.-Arab. 58 (1775) ; Trochain Contrib. Étude Vég. Sénégal 119, 382, t. 5, photo 355 (1940). *S. tetragona* Del.—F.W.T.A., ed. 1, 1 : 123.
Sen.: delta of the river inland almost as far as Richard Tol *fide* Trochain *l.c.* Also in N. Africa and E. Mediterranean.

4. HALOPEPLIS Bunge ex Ungern-Sternb.—F.T.A. 6, 1 : 84.

An annual much-branched herb 3–15 (–22) cm. high ; leaves small, fleshy, semiglobose, clasping, shorter than internodes ; flowers in dense ovoid to cylindrical spikes 0·3–2 cm. long, 2–3 mm. wide, the spikes numerous, lateral, alternate, divaricate, towards ends of branches .. .. *amplexicaulis*

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[1] Although this name is conserved under the International Rules, Forskål did not describe the genus.

H. amplexicaulis (*Vahl*) *Ungern-Sternb. ex Boiss.* Fl. Or. 4 : 934 (1875) ; Trochain Contrib. Étude Vég. Sénégal 116, 374 (1940). *Salicornia amplexicaulis* Vahl Symb. Bot. 2 : 1 (1791).
Sen.: Gandiole, in a salt-marsh with *Arthrocnemum glaucum, fide* Trochain *l.c.* Also in the Mediterranean region, from Sardinia, Italy and Sicily to Egypt ; in S. Africa, presumably introduced.

5. ARTHROCNEMUM Moq.—F.T.A. 6, 1 : 85.

Shrubby perennial about 0·6–1 m. high, very much branched ; inflorescence of dense, sometimes branched, spikes 1·5–17 cm. long and 4–5 mm. in diameter, terminal on stems and branches, or both terminal and lateral and often aggregated ; spikes composed of imbricate annular bracts, each subtending two groups of three flowers which are more or less sunken in the spike ; seeds glabrous, papillose, deep red-brown *glaucum*

A. glaucum (*Del.*) *Ungern-Sternb.* in Atti Congr. Int. Bot. Firenze 283 (1876) ; A. Chev. in Rev. Bot. Appliq. 2 : 747 (1922) ; Trochain Contrib. Étude Vég. Sénégal, 116, 365, t. 5, photo 299 (1940) ; A. Chev. in Rev. Bot. Appliq. 27 : 294 (1947). *Salicornia glauca* Del. in Descr. Egypt., Hist. Nat. 2 : 49 (1813). *Arthrocnemum pachystachyum* A. Chev. in Rev. Bot. Appliq. 2 : 747 (1922), not of (Bunge ex Ungern-Sternb.) A. Chev. (see Trochain *l.c.* 115). *Salicornia indica* of F.W.T.A., ed. 1, 1 : 123, not of Willd. (see Trochain *l.c.* 115). *Arthrocnemum indicum auct. fide* A. Chev. in Rev. Bot. Appliq. 27 : 294 (1947), not of (Willd.) Moq. Very similar in appearance to *Salicornia fruticosa.*
Sen.: St. Louis (May–June) *Chev.* 3524 ; 3525. St. Louis Gandiole region *fide* Trochain *l.c.* 116. L. Retba, N. of Rufisque *fide* Trochain *l.c.* 114. Widely distributed on seashores in the Northern Hemisphere.

6. SALICORNIA Linn.—F.T.A. 6, 1 : 86.

Shrubby perennial up to about 1 m. high ; each group of three fruits after falling leaving three cavities side by side in the spike .. .. .. 1. *fruticosa*
Herbaceous annuals up to about 0·45 m. high ; each group of three fruits after falling leaving three cavities in the spike arranged more or less in a triangle :
  Plant robust, 30–45 cm. high, much-branched, pyramidal in outline ; flowering spikes 15–25 mm. long, with about 10–13 joints .. .. 2. *senegalensis*
  Plant more slender, 10–20 cm. high, much-branched above, ovoid in outline :
    Flowering spikes short, 6–15 (–20) mm. long, with 4–8 joints 3. *praecox* var. *praecox*
    Flowering spikes long, 30–40 mm., with 15–20 joints 3a. *praecox* var. *longispicata*

1. **S. fruticosa** (*Linn.*) *Linn.* Sp. Pl., ed. 2 : 5 (1762). *S. europaea* Linn. var. *fruticosa* Linn. Sp. Pl., ed. 1 : 3 (1753). ? *S. arabica* of A. Chev. in Rev. Bot. Appliq. 27 : 294 (1947), not of Linn. Very similar in appearance to *Arthrocnemum glaucum.*
Sen.: saline tracts near mouth of R. Senegal *fide* Chev. *l.c.* Widely distributed along sea coasts.
2. **S. senegalensis** *A. Chev.* in Rev. Bot. Appliq. 27 : 292, t. 12A (1947).
Sen.: (July–Aug.) *Jaeger.* Hann, Dakar *Chev.*
3. **S. praecox** *A. Chev.* var. **praecox**—l.c. 27 : 292 t. 12B (1947).
Sen.: Hann, Dakar (Feb.) *Chev.* Growing mixed with the last.
3a. **S. praecox** var. **longispicata** *A. Chev.* l.c. 27 : 294, t. 12B, 1 (1947).
Sen.: L. Tanma (Dec.) *Chev.* 3452.

The identity of *S. europaea* Linn. recorded from L. Tanma by Trochain, Contrib. Étude Vég. Sénégal 114, 382, t. 4, photo 359 (1940), requires checking. Indeed Chevalier does not at all explain how *S. praecox* and *S. senegalensis* differ from the polymorphic *S. europaea.*

37. AMARANTHACEAE [1]

Annual or perennial herbs, rarely undershrubs or climbers ; leaves alternate or opposite, simple, exstipulate. Flowers actinomorphic, usually hermaphrodite, small, in spikes, heads or racemes, with often scarious bracts and bracteoles, the latter sometimes hooked. Sepals 3–5, free or nearly so, imbricate, more or less dry and membranous. Petals absent. Stamens mostly 5, opposite the sepals, hypogynous ; filaments united at the base into a short tube, often with staminodes between ; anthers 1- or 2-celled, opening by longitudinal slits. Ovary superior, 1-celled ; style short or long ; stigma capitate or 2–3-fid ; ovules solitary or rarely several, on basal funicles. Fruit dehiscing by a lid or indehiscent. Seeds globose, compressed or ellipsoid, smooth ; embryo annular, surrounding the copious endosperm.

Mainly in the tropics and subtropics, often occurring as weeds or escapes from cultivation. Recognized by the herbaceous habit, the alternate or opposite leaves without stipules, the small inconspicuous often scarious flowers without petals, the definite stamens shortly connate at the base, the 1-celled ovary, and annular embryo with endosperm.

*Leaves alternate :
  †Flowers glabrous or nearly so ; staminodes absent :
    Ovules several ; fruit with several seeds .. .. 1. **Celosia**

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[1] I am much indebted to K. Suessenguth of Munich for assistance and advice in revising this family for this edition.—R.W.J.K.

Ovule solitary :

Cymules with 2 or more fertile flowers, not accompanied by reduced sterile flowers 2. **Amaranthus**

Cymules with only 1 fertile flower accompanied by two sterile flowers reduced to scales.. .. .. 3. **Digera**

†Flowers accompanied by numerous soft woolly hairs ; staminodes present or absent :

Staminodes present ; fertile stamens 4–5 .. .. 4. **Aerva**

Staminodes absent ; fertile stamens 1–2 ; leaves sometimes opposite 5. **Nothosaerva**

*Leaves opposite :

Inflorescences with long hooked spines on the sterile flowers :

Staminodes present .. .. 6. **Cyathula**

Staminodes absent .. .. 7. **Pupalia**

Inflorescences without hooked spines :

Anthers 2-celled :

Flowers 2 or more together in a cymule subtended by a bract, 1–2 flowers fertile, the rest sterile :

Sterile flowers developing long feathery filaments up to 2 cm. long, fertile flowers 2 in each cymule ; flowers in large panicles of slender spikes ; large climbing herb or liane .. .. 8. **Sericostachys**

Sterile flowers without long filaments, fertile flower solitary in each cymule ; flowers in dense cylindrical spikes ; undershrub (*C. pobeguinii*) 6. **Cyathula**

Flowers solitary in the axis of each bract :

Flowers in terminal spikes ; staminodes present :

Leaves sessile or subsessile ; flowers not becoming reflexed in fruit 9. **Pandiaka**

Leaves petiolate ; flowers reflexed in fruit :

Bracteoles consisting of a long spine with a membranous wing on either side at its base ; perianth-segments subequal ; mostly terrestrial 10. **Achyranthes**

Bracteoles ovate-orbicular, not spiny ; perianth-segments very unequal ; stout aquatic herb .. .. 11. **Centrostachys**

Flowers in very numerous axillary spikes 5–15 mm. long ; staminodes absent ; leaves sometimes alternate (see above) .. .. 5. **Nothosaerva**

Anthers 1-celled :

Spikes pedunculate, terminal, or terminating short lateral branchlets :

Glabrous, succulent, maritime plant .. .. 12. **Philoxerus**

Hairy, non-succulent, terrestrial plant .. .. 13. **Gomphrena**

Spikes sessile, axillary .. .. 14. **Alternanthera**

1. **CELOSIA** Linn.—F.T.A. 6, 1 : 16 ; Schinz in E. & P. Pflanzenfam. 16C : 29 (1934).

Perianth-segments 6–10 mm. long, linear-lanceolate ; style 3–7 mm. long, very shortly 2–3-fid ; spikes simple, continuous, very dense-flowered ; leaves linear to linear-lanceolate .. .. 1. *argentea*

Perianth-segments 2–5 mm. long, oblong to oblong-elliptic ; style up to 1 mm. long ; spikes compound and often interrupted, with short lateral clusters of flowers ; leaves more or less ovate :

Seeds with very shallow reticulation, very glossy, flattened ; inflorescence lax, flower-clusters rarely over 1 cm. broad ; bracteoles and perianth-segments whitish, the latter 2–3 mm. long ; style less than 0·5 mm. long, 3-fid .. .. 2. *trigyna*

Seeds rather deeply reticulate, not glossy and not flattened :

Inflorescence elongated and pedunculate :

Inflorescence crowded, 5–20 mm. broad ; perianth-segments 3–5 mm. long ; style 3-fid, rarely 2-fid :

Bracteoles and perianth-segments white or pale-yellowish, the latter 3–5 mm. long ; large straggling plant to 3 m. high .. .. 3. *laxa*

Bracteoles and perianth-segments brownish, the latter 3 mm. long ; herb up to 1 m. high .. .. 4. *bonnivairii*

Inflorescence lax, with a long rhachis and rather widely spaced, few-flowered glomerules, up to 5 mm. broad ; bracteoles and perianth-segments brownish when dry, the latter 2–3 mm. long ; style usually 2-fid .. .. .. 5. *leptostachya*

Inflorescence globose, sessile or subsessile, mostly axillary.. .. .. 6. *globosa*

1. **C. argentea** *Linn.*—F.T.A. 6, 1 : 17. Erect branched annual, 2–6 ft. high ; flowering spike silvery-white, often pink-tinged. Probably introduced and naturalized ; often cultivated.
S.L.: Njala (Feb.) *Deighton* 1872 ! Newton (Aug.) *Deighton* 2204 ! **Lib.**: Kakatown *Whyte* ! **G.C.**: Aburi (Nov.) *Brown* 373 ! **Dah.**: *Le Testu* 130 ! **N.Nig.**: Nupe *Barter* 154 ! Ilorin (Mar.) *Lamb* 38 ! Biu (Sept.) *Noble* 29 ! Yola (Oct.) *Shaw* 90 ! **S.Nig.**: Lagos *Dawodu* 61 ! Benin City *Dennett* 16 ! Widespread in tropical Africa and Asia. (See Appendix, p. 36.) [The name *C. argentea* forma *cristata* (Linn.) Schinz (syn. *C. cristata* Linn.) has been applied to the frequent and varied faciated forms, some of which have yellow or red flowers and are cultivated.]

2. **C. trigyna** *Linn.*—F.T.A. 6, 1 : 19 ; Chev. Bot. 527. Laxly erect annual herb, decumbent below, 6–24 in. high, or straggling up a support to about 4 ft. ; flowers white with pink stamens. A frequent weed in waste places in savannah and forest regions.
Sen.: *Heudelot* 120 ! *Roger* ! **Gam.**: *Pirie* 56 ! **Fr.Sud.**: *fide* Chev. *l.c.* **Fr.G.**: Kouroussa (July) *Pobéguin*

338! **S.L.:** N'tunga, Samu (Dec.) *Sc. Elliot* 4331! Kambia (Dec.) *Deighton* 879! Musaia (Dec.) *Deighton* 4459! **Lib.:** Ganta (May, Oct.) *Harley*! **G.C.:** Accra (Oct.) *Ansell*! *Irvine* 830! Aburi (June) *Brown* 311! Tono, Navrongo (Nov.) *Darko* 449! **Togo:** Lome *Warnecke* 27! Kpeve (Mar.) *Williams* 46! **Fr.Nig.:** Niamey (Oct.) *Hagerup* 471! **N.Nig.:** Katagum *Dalz.* 155! Bauchi Plateau (July) *Lely* P. 372! Maiduguri (Nov.) *Elliott* 123! **S.Nig.:** Idanre (Jan.) *Brenan* 8723! **F.Po:** *T. Vogel* 180! Widespread in Africa; also in Arabia and Madagascar. (See Appendix, p. 36.)

3. **C. laxa** *Schum. & Thonn.*—F.T.A. 6, 1: 18; Chev. Bot. 527. A straggling herb, climbing in low forest-regrowth, to 10 ft. high; flowers white; rare in savannah.

Sen.: *Heudelot* 570! **Gam.:** *Brown-Lester* 17! **Fr.G.:** Nzérékoré (Oct.) *Baldwin* 9703! **S.L.:** Kambia (Dec.) *Sc. Elliot* 4227! *Deighton* 841! Njala (Dec.) *Deighton* 1769! Musaia (Dec.) *Deighton* 4557! **Lib.:** Grand Bassa (Apr.) *T. Vogel* 82! Gbanga (Sept.) *Linder* 747! Peahtah (Oct.) *Linder* 950! **Iv. C.:** Bingerville (Dec.) *Chev.* 16099! **G.C.:** Aburi (Oct.) *Johnson* 472! Kwahu (Jan.) *Irvine* 1686! **S.Nig.:** Lagos (May, Aug.) *Barter* 2145! *Dalz.* 1252! Olokemeji (Nov.) *Obaseki* FHI 23838! **Br.Cam.:** Rio del Rey *Johnston*! Mimbia (Apr.) *Hutch. & Metcalfe* 96! Buea (Jan., June) *Maitland* 38! 211! Tiko (Jan.) *Dunlap* 172! **F.Po:** (Dec.) *Mann* 80! *T. Vogel* 158! Extends to A.-E. Sudan, Belgian Congo, Angola and Rhodesia.

4. **C. bonnivairii** *Schinz* in Vierteljahrschr. Nat. Gesell. Zurich 76: 133 (1931); Hauman in Fl. Congo Belge 2: 21 (1951). Forest herb with brownish flower spikes; sometimes rooting at the nodes.

S.Nig.: Okomu F. R. (Jan.) *Brenan* 8839! **Br.Cam.:** Cam. Mt. (Apr.) *Maitland* 1082! Bali-Ngemba F. R., Bamenda (May) *Ujor* FHI 30351! **F.Po:** Moka (Jan.) *Guinea* 2190! Also in Belgian Congo.

5. **C. leptostachya** *Benth.*—F.T.A. 6, 1: 23. Weakly erect herb, 1–2 ft. high, or straggling, sometimes rooting at the nodes; flower spikes white, becoming brownish.

S.L.: Freetown (Aug.) *Deighton* 2067! Mamunta (Nov.) *Deighton* 4930! **S.Nig.:** Lagos (May) *Dalz.* 1253! Ibadan (Nov.) *Newberry* 159! Owo (Mar.) *Jones* FHI 3081! Ibuzo (Nov.) *Thomas* 2007! **F.Po:** (June) *Barter*! (Nov.) *T. Vogel* 141! Mt. Balea (Dec.) *Guinea* 340! Also in French Cameroons and Belgian Congo.

6. **C. globosa** *Schinz* l.c. 76: 137 (1931). Erect or straggling herb, branches to 30 in. long; flowers brownish-yellow.

S.Nig.: Oban *Talbot* 1283! **Br.Cam.:** Kumba Dist. (July) *Olorunfemi* FHI 30697! Also in Belgian Congo and Uganda.

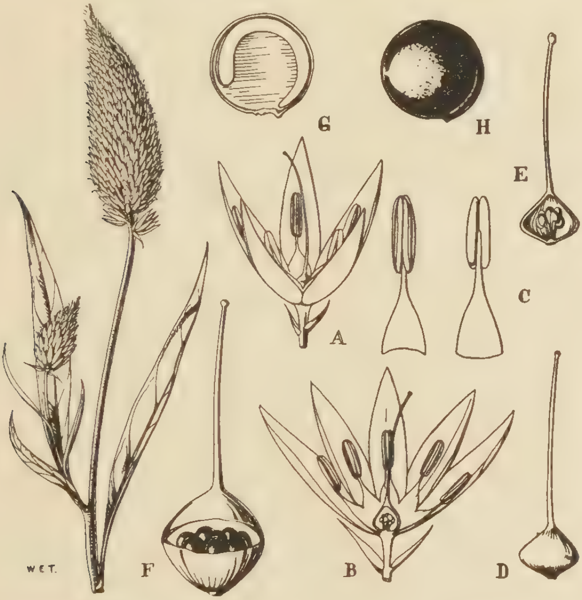

FIG. 52.—CELOSIA ARGENTEA *Linn.* (AMARANTHACEAE).

A, flower.
B, the same opened out with ovary in vertical section.
C, stamens, front and back.
D, ovary with style.
E, the same in section.
F, fruit showing dehiscence.
G, seed cut lengthwise.
H, seed.

2. **AMARANTHUS** Linn.—F.T.A. 6, 1: 30; Thellung in Asch. & Grabner Synopsis 5, 1: 225–356 (1914).

Plant with a pair of axillary spines; female perianth-segments 5, with sharp spiny tips; spikes elongated, mostly paniculate at the ends of the branches, often with globose clusters of flowers in the leaf-axils; fruit a circumscissile capsule . . 1. *spinosus*

Plant without axillary spines:

*Fruit a circumscissile capsule:

Female perianth-segments 5:

Fruit and bracteoles longer than the oblong female perianth-segments; inflorescence terminal and axillary, often richly branched; leaves narrowly cuneate at base 2. *hybridus* subsp. *cruentus*

Fruit shorter than the subequal bracteoles and linear-spathulate female perianth-segments; inflorescence terminal and axillary; leaves rhomboid-ovate, broadly triangular at base . . . . 3. *dubius*

Female perianth-segments 3:

Perianth-segments 1–1·5 mm. long, shortly pointed; flower clusters up to 5 mm. diam., all axillary; leaves very variable in shape, from linear to obovate, blade up to 4 cm. long and 2 cm. broad, usually much less . . . . 4. *graecizans*

Perianth-segments 2–3 mm. long, longly aristate ; flower clusters 5–15 mm. diam., many axillary, but with an elongated spike of clusters, usually with the clusters separated ; leaves ovate, up to 10 cm. long, petiole 2–6 cm. long 5. *tricolor*

*Fruit not circumscissile, indehiscent or tardily dehiscent into irregular pieces :

Fruit warted, 1–2 mm. long ; flowers in slender spike-like racemes, terminal and axillary .. .. 6. *viridis*

Fruit more or less smooth, 2–2·5 mm. long ; flowers in axillary clusters and in terminal clusters which unite in a large thick pseudo-spike .. .. 7. *lividus*

1. **A. spinosus** *Linn.*—F.T.A. 6, 1 : 32 ; Thellung in Asch. & Grabner Synopsis 5, 1 : 267 (1914) ; Chev. Bot. 528. Erect annual herb, 1–3 ft. high ; a common weed.
Sen.: *Heudelot* 735 ! **Gam.:** Kuntaur *Ruxton* ! **Fr.Sud.:** *fide* Chev. *l.c.* **S.L.:** Freetown (June, Dec.) *T. Vogel* 13 ! *Deighton* 479 ! Sherbro *Sc. Elliot* 5834 ! Njala (Nov.) *Deighton* 1501 ! Kenema (Jan.) *Thomas* 7676 ! **Lib.:** Kakatown *Whyte* ! Gbanga (Sept.) *Linder* 815 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Aburi *Brown* 411 ! Sekodumese (Jan.) *Kitson* ! Pong Tamale (July) *Williams* 826 ! **Togo:** Lome *Warnecke* 292 ! **Fr.Nig.:** *Hagerup* 513 ! **Dah.:** *fide* Chev. *l.c.* **N.Nig.:** Takwara (May) *Lely* 102 ! Vom *Dent Young* 216 ! **S.Nig.:** Lagos *Moloney* ! Idanre (Jan.) *Brenan* 8724 ! Oban *Talbot* 601 ! **Br.Cam.:** Buea (Apr., July) *Maitland* 43 ! *Hutch. & Metcalfe* 117 ! **F.Po:** (Nov., Dec.) *Mann* 32 ! *T. Vogel* ! Widespread in warm countries.

2. **A. hybridus** *Linn.* subsp. **cruentus** (*Linn.*) *Thell.* l.c. 243 (1914). *A. caudatus* of F.T.A. 6, 1 : 31, partly, and of F.W.T.A., ed. 1, 1 : 125, not of Linn. ; Chev. Bot. 527. Most of the specimens from our area are the var. *paniculatus* (Linn.) Thell. Erect branched annual herb, 1–5 ft. high ; flowers green or reddish ; commonly found cultivated or as a weed.
Fr.Sud.: Moriquèniéba (Mar.) *Chev.* 554 ! **Fr.G.:** Kouroussa (Aug.) *Pobéguin* 392 ! **S.L.:** Sherbro *Sc. Elliot* 5761 ! Layah, Scarcies *Sc. Elliot* 4653 ! Pendembu (July) *Thomas* 851 ! Njala (Apr., May) *Deighton* 695 ! 1886 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Agogo, Akim (Jan.) *Irvine* 638 ! Asuansi, (Feb.) *Williams* 9 ! **N.Nig.:** R. Niger *T. Vogel* 129 ! Lokoja (Aug.) *Elliott* 197 ! Katagum (Oct.) *Dalz.* 156 ! Yola (Aug.) *Dalz.* 203 ! **S.Nig.:** R. Ogbesse, Owo (Apr.) *Jones* FHI 3101 ! Throughout tropical Africa, and in S. Europe, America and Asia.

3. **A. dubius** *Mart. ex Thell.*—Thell. l.c. 265. Annual herb, 1–3 ft. high ; cultivated and as a weed.
S.L.: Freetown (Dec.) *Deighton* 477 ! Njala (Apr.) *Deighton* 1887 ! Kambia (Sept.) *Glanville* 406 ! **S.Nig.:** Ibadan (Oct.) *Newberry* 142 ! Widespread in tropical Africa and America.

4. **A. graecizans** *Linn.* Sp. Pl. 990 (1753) ; Chev. Bot. 528. *A. angustifolius* Lam. (1783)—Thell. l.c. 298. *A. blitum* of F.T.A. 6, 1 : 35, partly, and of F.W.T.A., ed. 1, 1 : 125, partly. *A. sylvestris* of Chev. Bot. 528. *A. oleraceus* of F.W.T.A., ed. 1, 1 : 125, partly, not of Linn. A variable weed, up to 2 ft. high. Many variants are recognized and A. W. Kloos has named the following at Kew : *T. Vogel* 21, *Barter* 1727 & *Dalz.* 303 as *A. angustifolius* Lam. subsp. *aschersonianus* Thell. var. *pseudangustifolius* Thell. ; *Barter* 1716 as subsp. *aschersonianus* Thell. var. *pseudo-silvester* Thell. ; *Hagerup* 652 & *Dalz.* 160 as var. *silvester* (Desf.) Thell. ; the remaining specimens as var. *angustifolius* (=subsp. *graecizans* (Linn.) Thell.).
Fr.Sud.: Lom (June) *Chev.* 1022 ! Timbuktu *Hagerup* 138 ! 171*a* ! **G.C.:** Accra *T. Vogel* 21 ! **Togo:** Lome *Warnecke* 363 ! **N.Nig.:** Nupe *Barter* 1716 ! 1727 ! Kano (Dec.) *Hagerup* 652 ! Mamu (May) *Lely* 166 ! Katagum (Jan., July) *Dalz.* 160 ! 303 ! Near L. Chad (Jan.) *E. Vogel* 31 ! *Golding* 48 ! Widespread in Africa, Europe and Asia.

5. **A. tricolor** *Linn.*—F.T.A. 6, 1 : 32 ; Thell. l.c. 272. Erect herb, 2–5 ft. high ; leaves, stems and flowers green or red ; a cultivated spinach. The only record from our area has been named by A. W. Kloos as var. *tristis* (Linn.) Thell. forma *inamoenus* (Willd.) Thell.
S.L.: Freetown (Dec.) *Deighton* 3350 ! Widespread in Africa, Asia and S. Europe.

6. **A. viridis** *Linn.*—F.T.A. 6, 1 : 33. *A. gracilis* Desf.—Thell. l.c. 335. *A. oleraceus* of F.T.A. 6, 1 : 34, partly, and of F.W.T.A., ed. 1, 1 : 125, partly, not of Linn. Annual, erect herb, 1–3 ft. high ; flowers yellowish-green, a very common weed ; used as spinach.
Sen.: *Farmar* 3 ! 24 ! Dakar (May) *Baldwin* 5700 ! **S.L.:** *Thomas* 9630 ! Freetown (Dec.) *Deighton* 478 ! **G.C.:** Achimota (Nov., Dec.) *Irvine* 798 ! 1515 ! **Togo:** Lome *Warnecke* 295 ! **N.Nig.:** Nupe *Barter* 1055 ! Sokoto (Nov.) *Moiser* 66 ! Kano (Dec.) *Hagerup* 651 ! Vom *Dent Young* 215 ! Katagum (July) *Dalz.* 157 ! 158 ! 159 ! **S.Nig.:** Idanre (Jan.) *Brenan* 8722 ! Aguku *Thomas* 771 ! 1093 ! Widespread in warm countries.

7. **A. lividus** *Linn.*—Thell. l.c. 319. *A. blitum* of F.T.A. 6, 1 : 35, partly, and of F.W.T.A., ed. 1, 1 : 125, partly. A variable species, occurring as a weed, and also cultivated. The Kew specimens have been referred to varieties by A. W. Kloos as shown below.
S.Nig.: Onitsha *Barter* 539 (var. *polygonoides* (Zoll.) Thell. forma *integrifolius* Thell.) ! Aguku *Thomas* 580 (var. *ascendens* (Loisel.) Thell.) ! Ibuzo (Nov.) *Thomas* 2016 (var. *polygonoides* (Zoll.) Thell.) ! Widespread in Africa, Asia, America and S. Europe.

For full synonymy and a key to the intraspecific variants reference must be made to Thellung in Asch. & Grabner, Synopsis 5, 1 : 225–356 (1914). Reference should also be made to Hauman's treatment in Fl. Congo Belge 2 : 26 (1951). I am much indebted to A. W. Kloos of Utrecht, who has identified most of the specimens of this genus at Kew.—R.W.J.K.

3. DIGERA Forsk.—F.T.A. 6, 1 : 29.

Much-branched herb ; stem and leaves sparingly pilose with weak hairs, or nearly glabrous ; leaves lanceolate or ovate, cuneate at base, 4–7 cm. long, 1–3·5 cm. broad, petiole 1–2·5 cm. long ; spikes axillary, 2·5–10 cm. long, on peduncles 2·5–8 cm. long ; flowers crowded, each fertile flower accompanied by two sterile scale-like flowers ; perianth-segments elliptic, 4–5 mm. long .. .. *alternifolia*

D. alternifolia (*Linn.*) *Asch.* in Schweinf. Beitr. Fl. Aeth. 180 (1867) ; Schinz in E. & P. Pflanzenfam. 16C : 41 (1933). *Achyranthes alternifolia* Linn. (1767). *D. arvensis* Forsk.—F.T.A. 6, 1 : 29. Straggling herb, 1–5 ft. high ; flowers pale green ; a weed.
S.Nig.: Awba Hills F. R. (Oct.) *Jones* FHI 7077 ! Widespread in central and east Africa, and in Arabia, Madagascar and Asia.

4. AERVA Forsk.—F.T.A. 6, 1 : 37.

Inflorescence a terminal panicle of dense leafless long cylindrical spikes ; stems densely covered with stellate hairs ; leaves lanceolate, 2–7 cm. long, 1–2 cm. broad, sometimes almost linear, lanate beneath .. .. 1. *javanica*

Inflorescence short and small, mostly axillary ; stem and leaves with simple hairs, or glabrescent ; leaves ovate-elliptic, 1·5–5 cm. long, 1–3 cm. broad .. 2. *lanata*

1. **A. javanica** (*Burm. f.*) *Juss. ex Schult.* Syst. Veg. 5 : 565 (1819) ; Chev. Bot. 529. *Iresine javanica* and *I. persica* Burm. f. (1768). *A. persica* (Burm. f.) Merrill (1921). *A. tomentosa* Forsk. (1775)—F.T.A. 6, 1 : 37 ; F.W.T.A., ed. 1, 1 : 125. Erect or suberect undershrub, hoary-white, 2–4 ft. high ; in arid localities.

Sen.: Richard Tol (Feb.) *Döllinger* 11 ! **Fr.Sud.:** El Oualadji (July) *Chev.* 1174 ! Timbuktu (June, July) *Chev.* 1286 ! *Hagerup* 101 ! 236 ! Agadem (Dec.) *E. Vogel* ! **Fr.Nig.:** Niamey (Oct.) *Hagerup* 541*a* ! **S.Nig.:** Sokoto (Feb., Nov.) *Lely* 838 ! Katagum (July) *Dalz.* 151 ! Maiduguri (July) *Ujor* FHI 23902 ! Kukawa *E. Vogel* 15 ! L. Chad (Jan.) *Daggash* FHI 24964 ! Extends from Mauritania through Africa to Arabia and India. Absent from Java.

2. **A. lanata** (*Linn.*) *Juss. ex Schult.*—F.T.A. 6, 1 : 39 ; Chev. Bot. 530. *Achyranthes lanata* Linn. (1753). Straggling herb, to 3 ft. high, flowers white ; in moister localities than the above.

S.L.: Talla (Feb.) *Sc. Elliot* 4865 ! Binkolo (Aug.) *Thomas* 1830 ! **Lib.:** Peahtah (Oct.) *Linder* 1094 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kumasi (Jan., Feb.) *Darko* 525 ! Krobo (Dec.) *Johnson* 518 ! Asuansi (Mar.) *Irvine* 1575 ! **Togo:** Lome *Warnecke* 14 ! **S.Nig.:** Lagos (Mar.) *Dennett* 482 ! *Millen* 165 ! Ibadan (June) *Jones* FHI 4355 ! Oban *Talbot* ! Widespread in tropical Africa and Asia including Malaysia. (See Appendix, p. 34.)

5. NOTHOSAERVA Wight—Schinz in E. & P. Pflanzenfam. 16C : 52 (1934).

Annual herb ; stem glabrous ; leaves opposite or alternate, elliptic or oblong-lanceolate, 2–5 cm. long, 0·5–2 cm. broad, thin and glabrous ; spikes very numerous, axillary, often in clusters, 5–15 mm. long and scarcely 2 mm. broad ; perianth-segments about 1·25 mm. long, villous outside .. .. *brachiata*

N. brachiata (*Linn.*) *Wight* Icon. 6 : 1 (1853) ; Schinz in E. & P. Pflanzenfam. 16C : 52 (1934). *Achyranthes brachiata* Linn. (1767). *Aerva brachiata* (Linn.) Mart.—F.T.A. 6, 1 : 40 ; F.W.T.A., ed. 1, 1 : 125. Erect or straggling, branched herb, to 2 ft. high ; flowers white.

Sen.: *Heudelot* 239 ! **N.Nig.:** Kukawa (Jan.) *E. Vogel* 7 ! Also in Ubangi-Shari-Chad, A.-E. Sudan, Angola, Mascarene Islands and India.

6. CYATHULA Blume—F.T.A. 6, 1 : 42.

Sterile flowers with long hooked spines :

Flowers in slender, elongated, spike-like racemes, up to 6 mm. broad, usually interrupted towards the base ; perianth-segments less than 4 mm. long :

Cymules (flower-clusters) subglobose or ovoid, with 2–3 fertile flowers ; perianth-segments 2–3 mm. long ; bracts long-acuminate ; leaves elliptic or rhomboid, shortly cuneate at base :

Cymules subsessile or with pedicels up to 1 mm. long ; fruiting cymules deflexed and touching the rhachis, hooked-spines narrowly radiating fan-wise ; much-branched more or less erect herbs, with relatively stout stem up to 3 mm. diam. ; stem and leaves rather densely pilose with long, weak hairs ; leaves 2–8 cm. long, 1·5–4 cm. broad .. .. 1. *prostrata*

Cymules with pedicels 1–2 mm. long ; fruiting cymules patent, not touching the rhachis, hooked spines widely radiating ; slender herb with prostrate stem scarcely more than 1 mm. diam., rooting at the nodes, and with sparingly branched erect shoots ; stem and leaves sparingly and shortly pilose ; leaves 2–5 cm. long, 1–3 cm. broad .. .. 2. *pedicellata*

Cymules ovoid-lanceolate, with one fertile flower ; perianth-segments 4 mm. long ; bracts acute ; leaves elliptic or obovate, long-cuneate at base, 3–18 cm. long, 1·5–9 cm. broad .. .. 3. *achyranthoides*

Flowers in dense cylindrical spikes, 1·2–2 cm. broad ; or in globose heads 2–3 cm. diam. ; perianth-segments 5–6 mm. long :

Flowers in cylindrical spikes up to 18 cm. long ; bracts broadly ovate, about 6 mm. long and 4 mm. broad, shining, persistent ; stems with long reflexed hairs ; leaves elliptic to ovate-elliptic, acute, 5–7 cm. long, 2·5–3·5 cm. broad, pilose 4. *cylindrica* var. *mannii*

Flowers in globose heads, 2–3 cm. diam. ; bracts lanceolate, 5–6 mm. long and 1·5 mm. broad ; stems pilose, densely so when young, with weak spreading hairs ; leaves ovate to elliptic, acute, 5–10 cm. long, 2·5–7 cm. broad, densely appressed pilose .. .. 5. *uncinulata*

Sterile flowers without hooked spines ; flowers in dense cylindrical spikes ; cymules composed of one fertile flower with densely villous perianth-segments, and 2–6 short densely villous sterile flowers ; leaves subsessile, elliptic, rounded at base, obtuse at apex, about 5 cm. long and 2·5 cm. broad ; densely villous on both surfaces 6. *pobeguinii*

1. **C. prostrata** (*Linn.*) *Blume*—F.T.A. 6, 1 : 43 ; Chev. Bot. 529. *Achyranthes prostrata* Linn. (1762). *Pupalia atropurpurea* of Chev. Bot. 529, not of Moq. (*fide* Hutch. & Dalz.). More or less erect, much-branched weed, 1–3 ft. high ; leaves green, sometimes tinged with red ; flowers green, often galled ; in waste places and forest margins.

Gam.: Genieri (Feb.) *Fox* 90 ! **Fr.Sud.:** Timbuktu (July) *Chev.* 1300 ! **Fr.G.:** *fide* Chev. *l.c.* **S.L.:** Sherbro *Sc. Elliot* 5844 ! Njala (Sept.) *Deighton* 2108 ! Musaia (Apr.) *Deighton* 5458 ! **Lib.:** Kakatown *Whyte* ! Monrovia (Oct., Nov.) *Cooper* 3 ! 25 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kumasi *Cummins* 123 ! Oda, C. P. (Aug.) *Howes* 965 ! Asuansi (Feb.) *Williams* 22 ! **Togo:** Lome *Warnecke* 180 ! **N.Nig.:** Lokoja (Oct.) *Dalz.* 202 ! Bauchi Plateau (Sept.) *Lely* P. 745 ! Abinsi *Dalz.* 789 ! **S.Nig.:** Lagos (May) *Dalz.* 1251 ! Sapoba *Kennedy* 2708 ! Enugu (Feb.) *Jones* FHI 656 ! Oban *Talbot* ! **Br.Cam.:** Likomba (Dec.) *Mildbr.* 10789 ! **F.Po:** (Oct.–Nov.) *T. Vogel* 33 ! *Mann* 39 ! Widespread in tropical Africa and Asia, and in Australia and central America. (See Appendix, p. 37.)

2. **C. pedicellata** *C. B. Clarke* in F.T.A. 6, 1 : 46 (1909). *C. prostrata* of F.W.T.A., ed. 1, 1 : 127, partly. *C. prostrata* forma *pedicellata* (C.B.Cl.) Hauman in Fl. Congo Belge 2 : 64. Slender forest herb with prostrate

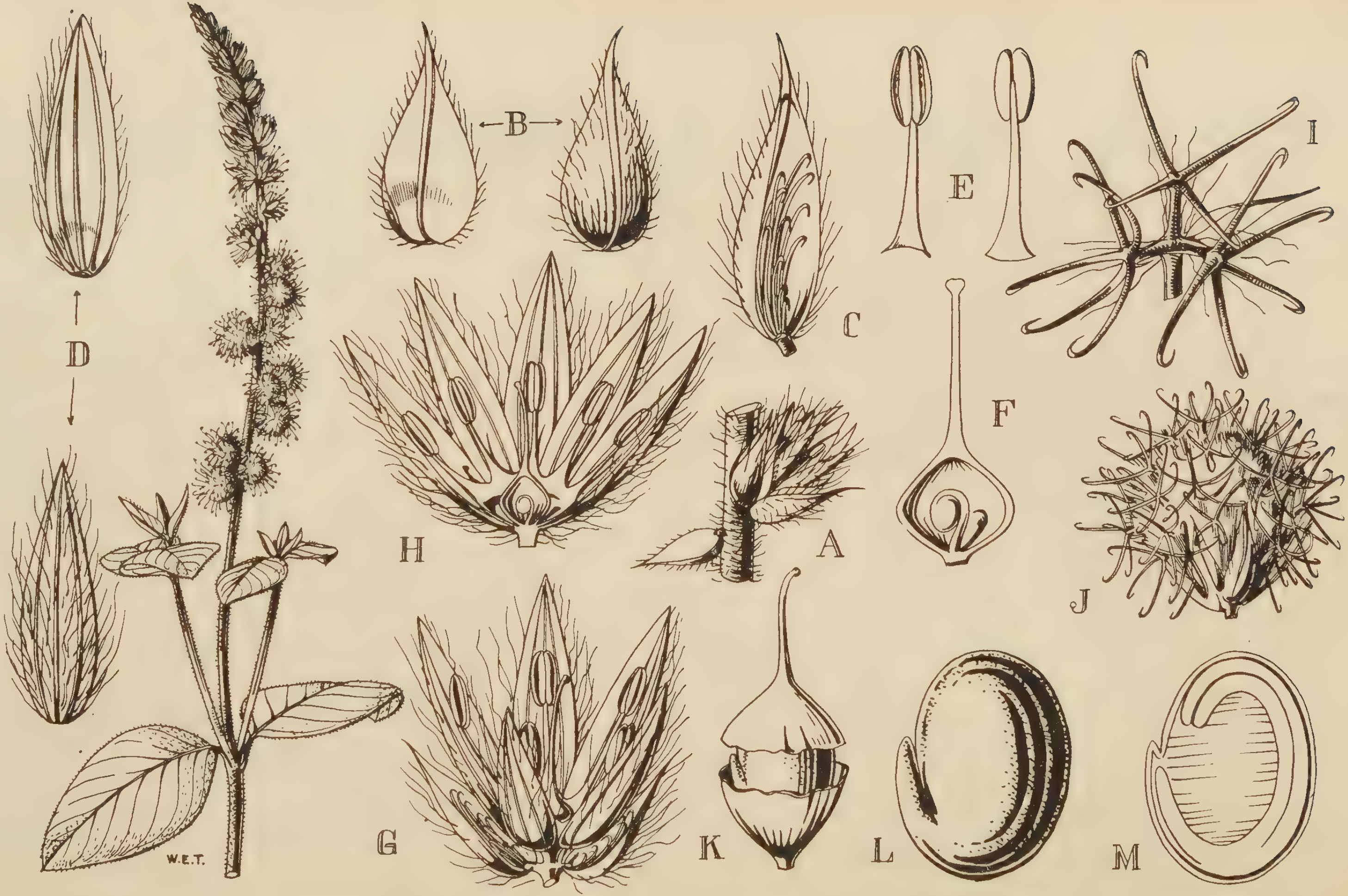

FIG. 53.—PUPALIA LAPPACEA (*Linn.*) *Juss.* (AMARANTHACEAE).

A, flower. B, bracts, inner and outer surface. C, sterile bracts. D, perianth-segments, inner and outer surface. E, stamens, front and back. F, ovary in vertical section. G, flower partially opened out. H, the same opened out with ovary in vertical section. I, hooked bracts of sterile flowers. J, fruit

stems rooting at nodes, erect shoots to 1 ft. high ; leaves deep green above purple beneath ; flowers and fruits greenish-red, often galled ; in closed forest.
S.L.: Lalahun, Gaura (Dec.) *King* 107*b* ! **G.C.:** Begoro Dist. (Mar.) *Irvine* 1817 ! Manso, Akim (Dec.) *Irvine* 2097 ! **S.Nig.:** Okomu F. R. (Jan.) *Brenan* 8850 ! **F.Po:** Mt. Balea (Dec.) *Guinea* 493 ! Also in Belgian Congo, Uganda and Tanganyika.

3. **C. achyranthoides** (*H. B. & K.*) *Moq.* in DC. Prod. 13, 2 : 326 (1849) ; Chev. Bot. 529. *Desmochaeta achyranthoides* H. B. & K. (1818). *C. geminata* (Thonn.) Moq.—F.T.A. 6, 1 : 44. Robust, much-branched herb, to 3 or 6 ft. high ; leaves and flowers green ; in forests, swamps and waste places.
Fr.Sud.: *fide* Chev. *l.c.* **S.L.:** Mamaka (Nov.) *Thomas* 4537 ! Batkanu (Jan.) *Deighton* 2847 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Nsawam (Aug.) *Deighton* 3394 ! **N.Nig.:** Lokoja *Barter* ! **S.Nig.:** Akilla (Feb.) *W. D. MacGregor* 499 ! Okomu F. R. (Jan.) *Brenan* 8851 ! **F.Po:** (Nov.) *T. Vogel* 253 ! Also in Belgian Congo and Uganda, and in central and south tropical America.

4. **C. cylindrica** *Moq.* var. **mannii** (*Bak.*) *Suesseng.* in Mitt. Bot. Staats. München. 6 : 188 (1953). *C. mannii* Bak.—F.T.A. 6, 1 : 46 ; F.W.T.A., ed. 1, 1 : 127. Scandent herb, stems to 10 ft. long ; calyx green, corolla white.
Br.Cam.: Cam. Mt., 5,000–7,000 ft. (Dec., Jan.) *Mann* 2007 ! *Dunlap* 34 ! *Mildbr.* 10812 ! *Maitland* 261 ! **F.Po:** 10,000 ft. *Mann* 296 ! The species is widespread in east, central and south Africa and in Madagascar.

5. **C. uncinulata** (*Schrad.*) *Schinz* in De Wild. Pl. Bequaert. 5 : 386 (1932). *Achyranthes uncinulata* Schrad. (1833). *C. globulifera* Moq.—F.T.A. 6, 1 : 44. Climbing herb ; stems to 16 ft. high ; flowers pale greenish-yellow.
Br.Cam.: Bamenda, 4,800 ft. (Feb.) *Migeod* 477 ! Widespread in east, central and south tropical Africa, and in Madagascar.

6. **C. pobeguinii** *Jac.-Fel.* in Bull. Soc. Bot. Fr. 96 : 196 (1949). Hairy undershrub, branches decumbent below, erect above.
Fr.G.: Dabola *Pobéguin* 987. Mali, 4,500 ft. *Jac.-Fel.* 2017.

Since going to press the following new species has been described :—

C. fernando-poensis *Suesseng. & Friedrich* in Mitt. Bot. Staats. München. 6 : 188 (1953).
F.Po : El Pico, 7,000 ft. (Dec.) *Boughey* 123 ; 124.

7. PUPALIA Juss.—F.T.A. 6, 1 : 47.

A herb ; branches very shortly and softly pubescent ; leaves ovate, petiolate, abruptly cuneate at base, acute at apex, about 4–6 cm. long and 2–3·5 cm. broad, velvety-pubescent when young ; lateral nerves distinct ; inflorescence pedunculate, usually interrupted, especially in fruit ; partial inflorescence sessile, armed with strong hooks *lappacea*

P. lappacea (*Linn.*) *Juss.*—F.T.A. 6, 1 : 47 ; Chev. Bot. 529. *Achyranthes lappacea* Linn. (1753). A weed, 2–4 ft. high, sometimes woody below, with greenish flowers, yellow or red stamens, and burr fruits.
Sen.: *Heudelot* 486 ! *Roger* 78 ! **Gam.:** *Ingram* ! **Fr.Sud.:** Bamba (Sept.) *Hagerup* 323 ! **S.L.:** (Mar.) *Deighton* 553 ! **G.C.:** Cape Coast Castle (July) *T. Vogel* 26 ! Dunquah *Cummins* 19 ! **Dah.:** Cotonou (Apr.) *Debeaux* 162 ! **N.Nig.:** Sokoto (Oct.) *Moiser* 124 ! Katagum *Dalz.* 153 ! Kukawa (Feb.) *E. Vogel* 61 ! **S.Nig.:** Olokemeji *Foster* 300 ! Igbatoro, Owo (May) *Jones* FHI 3588 ! Aboh *Barter* 474 ! Widespread in Africa, Madagascar and Arabia, extending through tropical Asia to New Guinea. (See Appendix, p. 37.)

8. SERICOSTACHYS Gilg & Lopr.—F.T.A. 6, 1 : 70.

Liane, or climbing herb ; stem and leaves glabrous or sparingly pubescent ; leaves elliptic or obovate, cuneate at base, long-acuminate, 6–10 cm. long, 3–6 cm. broad, petiole 1–2 cm. long ; flowers in large terminal panicle with tomentose rhachis ; each cluster with one fertile and 2–3 sterile flowers, the latter developing feathery white filaments, about 2 cm. long when plant is in fruit ; perianth-segments 4–5 mm. long *scandens*

S. scandens *Gilg & Lopr.*—F.T.A. 6, 1 : 71. Forest liane, very striking in fruit with its large feathery white panicles.
S.Nig.: Sapoba (fr. Mar.) *Jones* FHI 7444 ! **Br.Cam.:** Buea *Collier* FHI 1757 ! **F.Po:** Musola (Jan.) *Guinea* 1118 ! Also in French Cameroons, Belgian Congo and Uganda.

9. PANDIAKA (Moq.) Hook. f.—F.T.A. 6, 1 : 67 ; Suessenguth & Overknott in Bot. Archiv. 41 : 80 (1940).

Leaves lanceolate or ovate-lanceolate, sessile, subacute, up to 7 cm. long and 3 cm. broad ; whole plant long-pilose ; flower heads subtended by foliaceous, ovate bracts, about 1 cm. long .. .. 1. *involucrata*

Leaves linear, subsessile acute, up to 8 cm. long and 8 mm. broad ; whole plant sparingly pubescent ; flower heads subtended by linear, leaf-like bracts, up to 5 cm. long 2. *heudelotii*

1. **P. involucrata** (*Moq.*) *Hook. f.*—F.T.A. 6, 1 : 67 ; Suesseng. & Overknott in Bot. Archiv. 41 : 80 (1940), incl. var. *megastachya* Suesseng. *Achyranthes involucrata* Moq. in DC. Prod. 13, 2 : 310 (1849). A hairy, erect, branched herb, 2–4 ft. high ; flower heads white ; in savannah, especially dry hills and rocky places.
Gam.: (July) *Brooks* 17 ! **G.C.:** Dukwesein, Ashanti (Dec.) *Chipp* 609 ! Sekodumasi (Oct.) *Vigne* 3408 ! **Togo:** Kpedsu (Dec.) *Howes* 1032 ! **Dah.:** *Burton* ! **Fr.Nig.:** Niamey (Oct.) *Hagerup* 497 ! **N.Nig.:** Pandiaki (Sept.) *Ansell* ! Nupe *Barter* 944 ! Bauchi Plateau (May-Sept.) *Lely* 239 ! 581 ! P. 389 ! And many other localities. **S.Nig.:** Lagos *Rowland* ! Abeokuta *Irving* ! Opi, Nsukka (Aug.) *Jones* FHI 5868 ! Also in French Cameroons and Ubangi-Shari-Chad.

2. **P. heudelotii** (*Moq.*) *Hook. f.*—F.T.A. 6, 1 : 58 ; Suesseng. & Overknott l.c. 81, incl. var. *spicata* and var. *subglobosa* Suesseng. *Achyranthes heudelotii* Moq. ; Chev. Bot. 530. *Achyranthes angustifolia* Benth., not of Vahl ; Chev. Bot. 530. *Achyranthes benthami* Lopr. *P. benthami* (Lopr.) Schinz ; Suesseng. & Overknott l.c. A long-branched herb, 2–3 ft. high ; tips of calyx and bracteole often reddish.
Sen.: Bakel *Heudelot* 280. **Gam.:** *Hayes* 585 ! **Fr.Sud.:** Amango (Sept.) *Hagerup* 385 ! **Fr.G.:** *Scaetta* 3143 ! **S.L.:** Makunde (Apr.) *Sc. Elliot* 5699 ! Rowala (July) *Thomas* 1077 ! **G.C.:** Accra *Brown* 390 ! *Irvine* 542 ! **Togo:** Lome *Warnecke* 182 ! **N.Nig.:** R. Niger *T. Vogel* 98 ! Nupe *Barter* 1724 ! Bauchi Plateau (Aug.) *Lely* 557 ! P. 641 ! Katagum *Dalz.* 154 ! **S.Nig.:** Aguku *Thomas* 624 ! Jesse (Sept.) *Butler-Cole* 7 ! Also in Ubangi-Shari-Chad, Congo, Angola and A.-E. Sudan. (See Appendix, p. 37.)

10. ACHYRANTHES Linn.—F.T.A. 6, 1 : 62.

Perennial herb with short woody stems ; stem and leaves shortly and sparingly pubescent ; leaves linear to lanceolate, 3–8 cm. long, 5–12 mm. broad ; spikes slender, up to 15 cm. long ; flowers about 4 mm. long, becoming well separated from each other towards base of spike in fruit .. .. 1. *talbotii*

Annual herbs or perennials with well-branched woody stems ; leaves ovate-lanceolate, ovate or broadly elliptic :

  Leaves broadly elliptic, 8–26 cm. long, 3–10 cm. broad, sparingly pubescent or glabrescent ; bracts as long or nearly as long as the perianth ; basal wings of bracteole inserted on the thick base of the spine, otherwise free from it ; spike remaining rather dense towards the base .. .. 2. *bidentata*

  Leaves more or less ovate or ovate-lanceolate, generally not exceeding 10 cm. long and 5 cm. broad, long silky pilose to almost glabrous ; bracts $\frac{1}{2}$–$\frac{2}{3}$ as long as the perianth ; basal wings of bracteoles adnate throughout their length to the spine ; spike elongating and leaving the flowers well separated towards the base 3. *aspera*

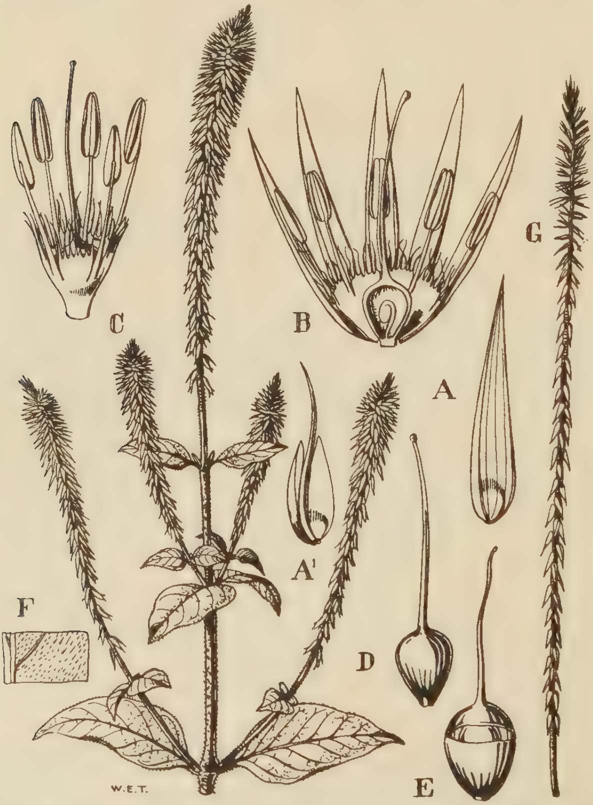

FIG. 54.—ACHYRANTHES ASPERA *Linn.* (AMARANTHACEAE).

A, perianth-segment.
A¹, bracteole.
B, flower laid open with ovary in longitudinal section.
C, flower with perianth removed, showing stamens and fimbriate staminodes.
D, ovary with style.
E, fruit splitting.
F, portion of under surface of leaf.
G, flower-spike.

1. **A. talbotii** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 127 (1927) ; Kew Bull. 1928 : 29. Perennial herb with short woody stems to 18 in. high, on rocks by streams ; flowers green with crimson stamens. *Keay* FHI 28264 has lanceolate leaves 2·5–4 cm. long, 10–12 mm. broad, obtuse at apex, and is the type of var. *ogojensis* Suesseng. in Mitt. Bot. Staats. Münch. 4 : 102 (1952).
   S.Nig.: Oban *Talbot* ! British Obokum (Dec.) *Keay* FHI 28264 ! **Br.Cam.:** R. Joke (Mar.) *Brenan* 9497 !
2. **A. bidentata** *Blume*—F.T.A. 6, 1 : 64. An erect forest herb, 2–4 ft. high ; leaves comparatively large, turning black-green on drying ; flowers glistening green.
   S.Nig.: Idanre Hills (Jan.) *Brenan* 8726 ! Oban *Talbot* ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 546 ! **F.Po:** *Mann* ! Widespread in the wetter parts of tropical Africa and Asia.
3. **A. aspera** *Linn.*—F.T.A. 6, 1 : 63. A common weed of waste places, very variable; much-branched, 1–6 ft. high, sometimes subscandent, sometimes woody ; flowers green or pinkish. .
   Sen.: *Sieber* 57 ! *Brunner* 3 ! **Fr.Sud.:** Timbuktu *Hagerup* 284 ! **S.L.:** Njala (Dec.) *Deighton* 2584 ! Hangha (Jan.) *Thomas* 7781 ! Musaia (Feb.) *Deighton* 4202 ! **G.C.:** Abetifi, Kwahu (Jan.) *Irvine* 1670 ! Kumasi *Cummins* 175 ! **N.Nig.:** Sokoto (Nov.) *Moiser* 14 ! Bauchi Plateau (Sept.) *Lely* P. 742 ! **S.Nig.:** Lagos *Millen* 101 ! Aguku *Thomas* 1383 ! **Br.Cam.:** Cam. Mt., 4,000–9,000 ft. (Jan., Apr., Dec.) *Mann* 1307 ! 1977 ! Bambui, Bamenda (Jan.) *Keay* FHI 28335 ! Ndu, Bamenda (Jan.) *Keay* FHI 28439 ! Throughout the hotter parts of the world. (See Appendix, p. 34.)

Imperfectly known species.

A. nodosa *Vahl*—F.T.A. 6, 1 : 65. We have not seen a specimen of this, which was collected by Isert at Whydah in Dahomey. It was supposed by Bentham to be a species of *Pandiaka.*

11. **CENTROSTACHYS** Wall.—Schinz in E. & P. Pflanzenfam. 16C : 62 (1934).

Aquatic herb, with stout, conspicuously grooved, floating stems ; leaves lanceolate to ovate, cuneate at base, acute at apex, 7–18 cm. long, 2–6 cm. broad, pilose beneath with appressed white hairs when young ; spikes 10–30 cm. long, flowers not very acutely reflexed in fruit ; bracts and bracteoles ovate-orbicular, 3–4 mm. long ; perianth-segments unequal, 5–8 mm. long, the outer longest one terminating in a firm, slightly recurved, subulate tip .. .. *aquatica*

C. aquatica (*R. Br.*) *Wall.*—Schinz in E. & P. Pflanzenfam. 16C : 62 (1934). *Achyranthes aquatica* R. Br.—F.T.A. 6, 1 : 64 ; F.W.T.A., ed. 1, 1 : 127 ; Chev. Bot. 530. Stout herb in marshy places ; stems up to 6 ft. long, rooting at the lower nodes.
Sen.: Kaédi (Dec.) *Chev.* 3446. **N.Nig.:** Katagum (Oct.) *Dalz.* 152 ! Widespread in tropical Africa and Asia.

12. **PHILOXERUS** R. Br.—F.T.A. 6, 1 : 74.

A decumbent, glabrous, rather succulent herb ; leaves linear, slightly broader towards the apex, abruptly acute, amplexicaul at the base, up to 5 cm. long and 0·5 cm. broad, fleshy ; spikes sessile, ovoid to cylindrical, up to 2·5 cm. long, sometimes clustered ; bracts white, ovate-acute, about 3 mm. long, 1-nerved *vermicularis*

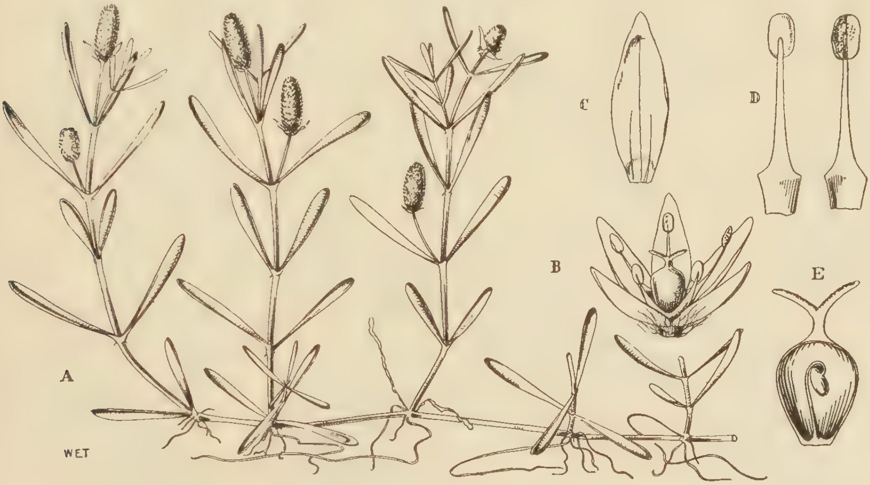

FIG. 55.—PHILOXERUS VERMICULARIS (*Linn.*) *P. Beauv.* (AMARANTHACEAE).

A, the plant. B, flower opened out. C, perianth-segment. D, stamens, back and front. E, ovary cut vertically.

P. vermicularis (*Linn.*) *P. Beauv.* Fl. Oware 2 : 65, t. 98 (1818) ; Milne-Redhead in Kew Bull. 1948 : 452. *Gomphrena vermicularis* Linn. (1753). *P. vermiculatus* Sm.—F.T.A. 6, 1 : 75. *Iresine vermicularis* (Linn.) Moq.—Chev. Bot. 531. Decumbent herb with woody root ; flowers silvery-white ; a coastal sand-binder. **Sen.:** *Perrottet* 482 ! Richard Tol (May) *Döllinger* 59 ! Dakar (Jan.–May) *Hagerup* 779 ! *Baldwin* 5746 ! Niayes (Dec.) *Chev.* 3448 ! **Gam.:** Genieri (Feb.) *Fox* 67 ! **Fr.G.:** Conakry *Rattray* ! **S.L.:** Kalangba, Little Scarcies (Apr.) *Glanville* 257 ! Aberdeen (July) *Small* 119 ! Turtle Isl. (Nov.) *Deighton* 2396 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Sekondi (Dec.) *Johnson* 977 ! Accra (Jan., May, Nov.) *Brown* 376 ! *Irvine* 1963 ! **Togo:** Lome *Warnecke* 50 ! **S.Nig.:** Lagos (Apr.) *Dalz.* 1359 ! Brass *Barter* 1874 ! Nun R. (Aug.) *T. Vogel* 59 ! **Br.Cam.:** Ambas Bay (Apr.) *Hutch. & Metcalfe* 136 ! Coasts of W. Africa from Senegal to Angola, and on eastern coasts of central America. (See Appendix, p. 37.)

13. **GOMPHRENA** Linn.—F.T.A. 6, 1 : 75.

A hairy annual up to 1 m. high ; stems and branches contracted at the nodes ; leaves obovate-oblanceolate, shortly petiolate, very acute, about 5–8 cm. long and up to 3 cm. broad, pilose with long weak hairs ; spikes subglobose or rarely shortly cylindrical, up to 4·5 cm. long and 2 cm. broad, with an involucre of 2–3 foliage leaves, the bracts and flowers persisting, pink or yellow, the former with slightly toothed margins *globosa*

G. globosa *Linn.*—F.T.A. 6, 1 : 75. A native of S. America, cultivated as an ornamental, also subspontaneous. **S.L.:** Njala (Feb.) *Deighton* 1875 ! **N.Nig.:** Sokoto (Nov.) *Moiser* 31 ! **S.Nig.:** Brass *Barter* 116 ! Old Calabar (Apr.) *Holland* 121 ! Oban *Talbot* 662 ! Widespread in the tropics. (See Appendix, p. 37.)

G. celosioides Mart., also a native of S. America, is common as a weed in eastern Africa as far west as Katanga ; it is not yet recorded from our area. See Milne-Redhead in Kew Bull. 1944 : 23 (1947).

14. **ALTERNANTHERA** Forsk.—F.T.A. 6, 1 : 72. *Telanthera* R.Br.—F.T.A. 6, 1 : 72.

Plant maritime with fleshy stem and leaves ; stems rooting at nodes ; leaves oblanceolate to obovate, mucronate, narrowed to base, 3–5 cm. long, 1·5–3 cm. broad ; flower-clusters axillary, ovoid, up to 1·5 cm. long ; perianth-segments unequal, the two

outer longer segments about 6 mm. long, strongly 3-nerved ; stamens 5, longer than the gynaecium ; anthers linear ; fruit not, or only slightly, flattened 1. *maritima*
Plant not maritime, stem and leaves not fleshy ; stamens 3, not longer than the gynaecium ; anthers ovate ; fruit flattened and winged :
Perianth-segments ending in a hard, sharp spine ; segments unequal, the two outer larger ones about 5 mm. long, 3-nerved ; leaves obovate or rounded-obovate, mucronate, entire, 2–4 cm. long, 1–2 cm. broad, pustulate and sparingly pubescent on the nerves .. .. 2. *repens*
Perianth-segments acute but not ending in a hard spine ; segments equal :
Perianth-segments 4 mm. long, very acute, completely hiding the mature fruit ; leaves linear-lanceolate, acute or subacute, obscurely undulate, up to 7 cm. long and 1 cm. broad, glabrous or nearly so .. .. 3. *nodiflora*
Perianth-segments 2–2·5 mm. long, not very acute, not hiding the mature fruit ; leaves oblanceolate or elliptic, up to 8 cm. long and 2 cm. broad, but often much smaller, glabrous or nearly so and often pustulate .. .. 4. *sessilis*

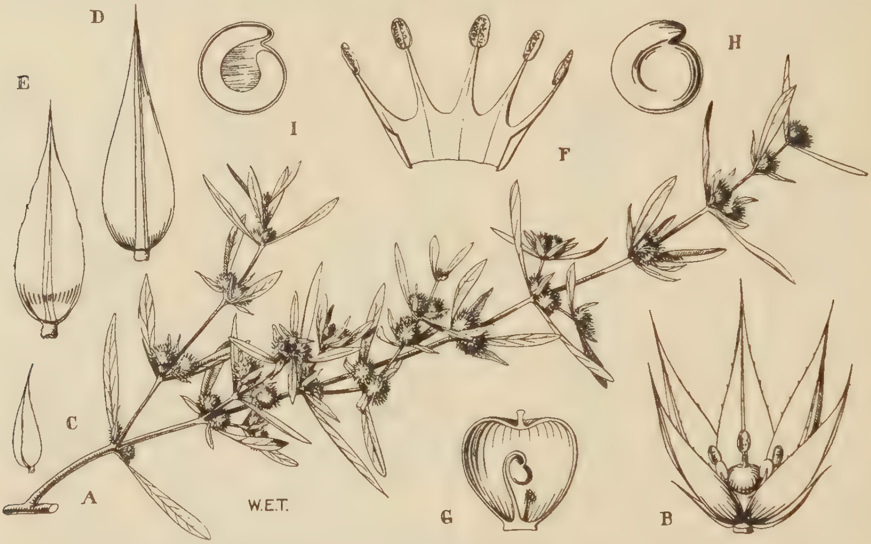

FIG. 56.—ALTERNANTHERA NODIFLORA *R.Br.* (AMARANTHACEAE).

A, portion of the plant. B, flower. C, bracteole. D, E, perianth-segments. F, stamens. G, ovary in longitudinal section. H, seed. I, seed in longitudinal section.

1. **A. maritima** (*Mart.*) *St.-Hil.*—Schinz in E. & P. Pflanzenfam. 16C : 74 (1934) ; Chev. Bot. 530. *Bucholzia maritima* Mart. (1826). *Telanthera maritima* (Mart.) Moq.—F.T.A. 6, 1 : 72 ; F.W.T.A., ed. 1, 1 : 128. Coastal plant, with long creeping stems, up to 20 ft. long ; flowers silvery-white on erect shoots.
Sen.: *Döllinger* 51 ! Dakar (Jan.) *Chev.* 3449 ! **Gam.**: *Hayes* 504 ! **S.L.**: Turtle Isl. (Nov.) *Deighton* 2344 ! Mano Salija (Nov.) *Deighton* 276 ! **Lib.**: Grand Bassa (July) *T. Vogel* 4 ! **Iv.C.**: *fide* Chev. *l.c.* **G.C.**: *Burton* ! Labadi beach, Accra (Jan.) *Irvine* 1951 ! **S.Nig.**: Lagos *Moloney* ! Nun R. (Sept.) *T. Vogel* 20 ! *Mann* 472 ! Eket *Talbot* 3095 ! West coast of Africa from Senegal to Angola, and on eastern coast of S. America.

2. **A. repens** (*Linn.*) *Link.* Enum. Pl. Berol. 1 : 154 (1821) ; Schinz l.c. 73. *Achyranthes repens* Linn. (1753). *A. echinata* Sm.—F.T.A. 6, 1 : 74 ; Chev. Bot. 530. Creeping herb, with white flowers ; a common weed on dry ground.
Sen. & Fr.Sud.: *fide* Chev. *l.c.* **Fr.G.**: Kouroussa (June) *Pobéguin* 296 ! **G.C.**: Cape Coast Castle (July) *T. Vogel* 37 ! Accra (Mar.) *Deighton* 585 ! Aburi *Brown* 470 ! Mampon *Rattray* 21 ! **Togo**: Lome *Warnecke* 279 ! **Dah.**: *Le Testu* 193 ! **N.Nig.**: Nupe *Barter* 852 ! 1708 ! Sokoto *Lely* 143 ! Kano (Nov.) *Hagerup* 621 ! **S.Nig.**: between Ibadan and Abeokuta (Mar.) *Schlechter* 13033 ! Shasha F. R. (May) *Tamajong* FHI 16937 ! Widespread in Africa, extending to S.W. Asia ; and in central America. (See Appendix, p. 35.)

3. **A. nodiflora** *R. Br.*—F.T.A. 6, 1 : 73. *A. sessilis* var. *nodiflora* (R. Br.) O. Ktze.—Chev. Bot. 531. Decumbent herb, often with woody rootstock ; flowers white.
Sen.: *Heudelot* 130 ! Dakar (May) *Baldwin* 5716 ! **Gam.**: Genieri (Feb.) *Fox* 89 ! **Fr.Sud.**: *Bellamy* ! **Fr.G.**: *fide* Chev. *l.c.* **N.Nig.**: Sokoto (Dec.) *Moiser* 253 ! Kano (Dec.) *Hagerup* 665 ! Nguru (June) *Onochie* FHI 23342 ! R. Benue (Sept.) *Talbot* ! Widespread in tropical Africa ; also in India, Malaya and Australia. (See Appendix, p. 35.)

4. **A. sessilis** (*Linn.*) *R. Br. ex Roth*—Schinz l.c. 72 ; Chev. Bot. 531. *Gomphrena sessilis* Linn. (1753). *A. achyranthoides* Forsk.—F.T.A. 6, 1 : 73. A common and variable weed with silvery-white flowers ; prostrate and much-branched in dry situations, but with erect shoots to 18 in. high from a creeping and rooting stem in moist situations.
Sen.: *Roger* 19 ! Niayes (Dec.) *Chev.* 3451 ! **Gam.**: Kuntaur *Ruxton* 26 ! **Fr.Sud.**: Kabara (Sept.) *Hagerup* 298 ! Djenné (June) *Chev.* 1111 ! **Fr.G.**: *fide* Chev. *l.c.* **S.L.**: Njala (Sept.) *Deighton* 2077 ! Musaia (Mar.) *Sc. Elliot* 5103 ! Tambia (Dec.) *Sc. Elliot* 4204 ! Rokupr (Mar.) *Deighton* 5368 ! **Iv.C.**: *fide* Chev. *l.c.* **G.C.**: Aburi (June) *Brown* 316 ! Accra (Apr., July) *Irvine* 733 ! 1587 ! **Dah.**: Whydah *Isert* ! **N.Nig.**: Bauchi Plateau (July, Aug.) *Lely* 29 ! P. 367 ! *Keay* FHI 12721 ! **S.Nig.**: R. Niger

Barter 126! 872! Idanre (Jan.) *Brenan* 8721! 8745! Onitsha (May) *Onochie* FHI 7519! **Br.Cam.:** Buea (Oct.) *Maitland* 89! Bamenda (Feb.) *Migeod* 497! **F.Po:** (Nov.) *T. Vogel* 204! Widespread in the warmer parts of the world. (See Appendix, p. 35.)

In addition to the above, *A. bettzickiana* (Regel) Nicholson (syn. *Telanthera bettzickiana* Regel) is commonly grown in gardens as an ornamental edging plant.

38. BASELLACEAE

Twiners with slender stems and rather fleshy alternate entire petiolate leaves ; stipules absent. Flowers hermaphrodite, actinomorphic, in spikes, racemes or panicles ; bracts small ; bracteoles 2, often united to the base of the calyx. Sepals 5, often coloured, almost free or united into a 5-lobed tube, imbricate, persistent in fruit. Petals absent. Stamens 5, inserted opposite and at the base of the sepals ; filaments free, short ; anthers with 2 parallel cells opening longitudinally. Ovary superior, 1-celled, with a solitary basal shortly stalked ovule ; style terminal, often deeply divided into 3 stigmas. Fruit indehiscent, surrounded by the persistent often fleshy calyx. Seed solitary, almost spherical, with a membranous testa ; endosperm copious, surrounded by the spirally twisted embryo.

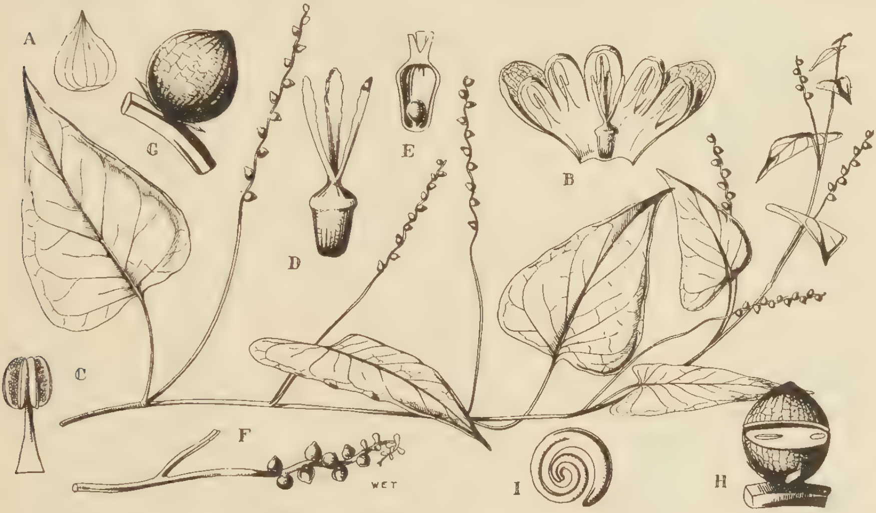

FIG. 57.—BASELLA ALBA *Linn.* (BASELLACEAE).

A, flower-bract. B, flower laid open. C, stamen. D, ovary. E, the same in vertical section. F, flowering and fruiting spike. G, fruit. H, the same half-cut transversely.

A small family, mostly in tropical South America, the genus *Basella* African and Asiatic, and often cultivated.

BASELLA Linn.—F.T.A. 6, 1 : 94.

Leaves alternate, entire. Spikes simple or branched, slender ; bracts small ; bracteoles 2, united into a two-lipped cup adnate to the calyx. Flowers small, hermaphrodite ; sepals 5, united into a fleshy tube, the lobes incurved over the fruit ; stamens 5, inserted near the top of the calyx-tube ; ovary ovoid.

Twiner, glabrous, with slender somewhat fleshy branches ; leaves broadly ovate, petiolate, widely cordate at the base, usually acutely acuminate, up to 10 cm. long and 7 cm. broad, with 4–5 pairs of lateral nerves ; spikes axillary, simple and slender or shorter and branched ; bracts broadly ovate, submembranous, acute, about half the length of the flower ; fruit enclosed by the persistent succulent calyx, broadly ovoid, almost 0·5 cm. long .. .. *alba*

B. alba *Linn.*—F.T.A. 6, 1 : 94 ; Chev. Bot. 535. *B. rubra* Linn.—Chev. Bot. 535. A climber, cultivated in vegetable gardens ; sometimes subspontaneous.
S.L.: Kukuna, Scarcies *Sc. Elliot* 4664! Masasa *Glanville* 45! **Iv.C.:** Bouaké (July) *Chev.* 22126. **Togo:** Sokode *Kersting* A. 684! **Dah.:** Djougou (June) *Chev.* 23901. **S.Nig.:** Lagos *Dalz.* 1030! Ologbo, Benin *Kennedy* 2152! **Br.Cam.:** Cam. Mt., 1,000 ft. (Dec.) *Mann* 1250! Also in other parts of tropical Africa, Asia and the West Indies. (See Appendix, p. 38.)

39. GERANIACEAE

Annual herbs or undershrubs, rarely arborescent ; leaves alternate or opposite, mostly lobate, dissected or compound ; stipules often paired. Flowers often handsome, hermaphrodite, actinomorphic or slightly zygomorphic, axillary, solitary to subumbellate. Sepals persistent, 4–5, free or connate to the middle, imbricate or rarely valvate, the dorsal one sometimes spurred. Petals 5, rarely 4, very rarely absent, hypogynous or subperigynous, imbricate, rarely contorted. Stamens 2–3 times the number of the sepals, sometimes a few without anthers ; filaments mostly more or less connate at the base ; anthers 2-celled, opening lengthwise. Ovary 3–5-lobed ; ovules 1–2 in each cell, superposed, pendulous, rarely more than 2. Fruit lobed ; lobes 1-seeded, rarely more-seeded, often beaked, opening from the base upwards. Seeds pendulous, with thin or no (rarely copious) endosperm and mostly curved or folded embryo.

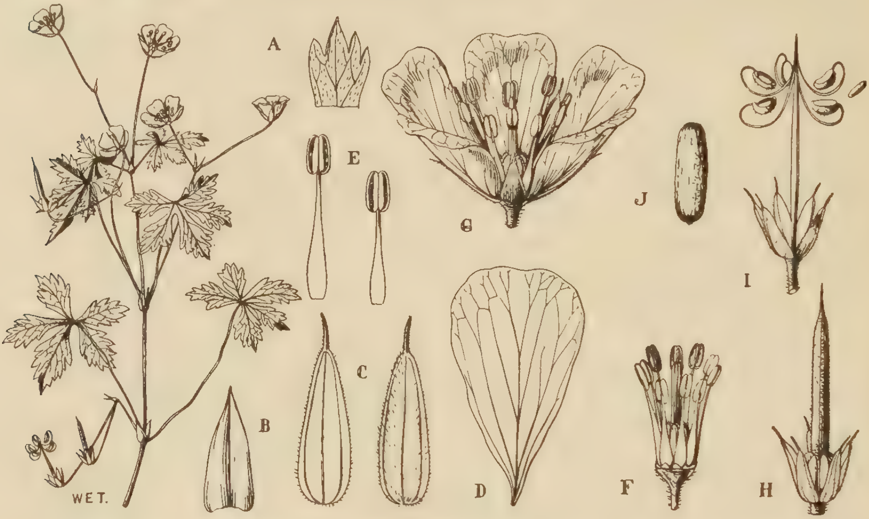

Fig. 58.—Geranium simense *Hochst. ex A. Rich.* (Geraniaceae).

A, segment of leaf. B, stipule. C, sepals, inner and outer face. D, petal. E, stamens. F, flower with sepals and petals removed. G, flower. H, ovary with sepals. I, fruit. open. J, seed.

A cosmopolitan family, numerous in temperate and subtropical regions ; leaves stipulate ; petals mostly imbricate ; fruits often with long beaks and deeply lobed at the base.

Stamens 15, united into 5 bundles ; leaves (in our species) ovate or lanceolate, denticulate .. .. 1. **Monsonia**

Stamens 10, free or slightly connate at the base ; leaves (in our species) digitately divided .. .. 2. **Geranium**

1. MONSONIA Linn.—F.T.A. 1 : 289.

Flowers solitary ; peduncle about 2 cm. long, with a pair of 1 cm. long subulate bracts subtending the 1–2 cm. long pedicel which becomes sharply bent in fruit ; sepals abruptly caudate-acuminate, silky-pilose ; fruits 7–9 cm. long ; leaves ovate, 2–3 cm. long, 1·5–2 cm. broad, cordate at base, acute at apex, repand-denticulate, 7–9-nerved at base, slightly pubescent beneath on the nerves ; petiole about 1½ times as long as lamina ; stipules interpetiolar, subulate, about 8 mm. long 1. *senegalensis*

Flowers 2–6, umbellate on a slender straight peduncle 7–10 cm. long, with several bracts about 3 mm. long subtending the pedicels which do not bend back in fruit ; sepals mucronate, silky ; fruits 4 cm. long ; leaves ovate-lanceolate, about 1·7 cm. long and 1 cm. broad, rounded at base, subacute at apex, crenate with prominent lateral nerves, villous on both surfaces ; petiole and stipules similar to above .. 2. *nivea*

1. **M. senegalensis** *Guill. & Perr.*—F.T.A. 1 : 290 ; R. Knuth in Engl. Pflanzenr. Geraniac. 301 (1912). Herb of dry regions, woody at base ; flowers pink.
Sen.: *Perrottet* 136 ! Richard Tol *Lelievre.* **Fr.Nig.:** Amango (Sept.) *Hagerup* 381 ! **N.Nig.:** Katagum *Dalz.* 60 ! Across to Abyssinia, Egypt and western India ; also in S.W. Africa, Ngamiland and Transvaal. (See Appendix, p. 39.)

2. **M. nivea** (*Decne.*) *Decne. ex Webb* Fragm. Fl. Aethiop. 59 (1854) ; R. Knuth l.c. 293 ; Chev. Bot. 98. *Erodium niveum* Decne. (1835). Hoary herb with long woody underground stem ; flowers pink.
Fr.Sud.: Bilma (Feb.) *Chev.* 28642. Also in Mauritania, N. Africa, Egypt, Arabia and Palestine. (See Appendix, p. 39.)

2. GERANIUM Linn.—F.T.A. 1 : 290.

By E. Milne-Redhead

Weak straggling perennial ; stems densely pilose with simple hairs or glabrescent ; pedicels 10–35 mm. long ; petals uniformly pink or mauve ; carpels smooth, when ripe ejecting the seed .. .. 1. *simense*

More or less erect annual ; stems rather densely pilose with both glandular and simple hairs ; pedicels 2–20 mm. long ; petals pink or mauve with a deep purplish basal area ; carpels with transverse ridges, when ripe falling off with the seed enclosed 2. *ocellatum*

1. **G. simense** *Hochst. ex A. Rich.*—F.T.A. 1 : 291, incl. vars. *glabrior* Oliv. and *repens* Oliv. A diffusely branched herb up to 8 ft. high with scrambling habit ; leaves digitately divided to below the middle ; petals pink or mauve.
S.Nig.: Sonkwala, 5,200 ft. (fr. Dec.) *Keay & Savory* FHI 25256 ! **Br.Cam.:** Cam. Mt., 5,000–9,000 ft. (fl. Nov.–Mar., fr. Jan.–Apr.) *Mann* 1323 ! 1966 ! *Maitland* 1234 ! *Mildbr.* 10873 ! *Preuss* 648 ! *Brenan* 9370 ! Bamenda, 5,500–8,000 ft. (fl. & fr. Jan.) *Migeod* 334 ! *Keay* FHI 28352 ! Nchan, Bamenda, 5,000 ft. (fl. & fr. May) *Maitland* 1730 ! **F.Po:** 8,500 ft. (fl. & fr. Dec.) *Mann* 619 ! Mioko (fl. & fr. Jan.) *Guinea* 1871 ! Widespread on the mountains of tropical Africa and Arabia.

2. **G. ocellatum** *Cambess.*—R. Knuth in Engl. Pflanzenr. Geraniac. 62 (1912). *G. favosum* Hochst. ex A. Rich. var. *sublaeve* Oliv. F.T.A. 1 : 292. *G. ocellatum* var. *camerunense* R. Knuth l.c. 63. *G. ocellatum* var. *sublaeve* (Oliv.) Milne-Redhead in Kew Bull. 1948 : 453. *G. brevipes* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 138 ; Kew Bull. 1928 : 30. A more or less erect annual up to 4 ft. high ; leaves digitately divided below the middle ; flowers pink or mauve with a darker centre.
Br.Cam.: Cam. Mt., 6,000–9,000 ft. (fl. & fr. Nov.–Mar.) *Mann* 1261 ! *Maitland* 811 ! *Mildbr.* 10872 ! *Brenan* 9554 ! Ndu, Bamenda, 6,400 ft. (fl. & fr. Jan.) *Keay* FHI 28437 ! Widespread on the mountains of tropical Africa and eastwards to western Himalayas.

40. OXALIDACEAE

Herbaceous or suffrutescent, rarely arborescent. Leaves alternate, digitately or pinnately compound, sometimes simple by suppression of the leaflets ; leaflets spirally coiled when young, usually closing at night ; stipules absent. Flowers hermaphrodite, actinomorphic, sometimes of two kinds, some perfect and others minute and apetalous, solitary or subumbellate, rarely racemose or cymose. Calyx 5-fid or 5-partite, imbricate. Petals 5, shortly clawed, free or shortly connate at the base, contorted. Stamens 10, hypogynous, connate at the base, sometimes 5 of them without anthers ; anthers 2-celled, opening lengthwise. Ovary 5-celled, superior ; styles 5, free, persistent ; stigmas capitate or shortly divided ; ovules 1 or more, axile. Fruit mostly a capsule. Seeds often with an elastic epidermis ; endosperm fleshy, copious ; embryo straight.

A small family but rich in species, very numerous in the drier parts of South Africa ; leaves sometimes sensitive ; petals contorted ; stamens double the number of the petals ; styles free.

Leaves trifoliolate ; valves of the fruit persisting around the central axis ; leaflets obcordate ; leaves not sensitive to touch .. .. 1. **Oxalis**

Leaves pinnate ; valves of the fruit finally spreading ; leaflets not obcordate ; leaves sensitive to touch .. .. 2. **Biophytum**

Besides the above, *Averrhoa carambola* Linn. (5–10 leaflets, flowers on leafy shoots, fruit acutely angled) the Carambola, and *A. bilimbi* Linn. (10–20 or more leaflets, flowers on older wood, fruit obtusely angled), the Blimbing, are occasionally cultivated for their fruits.

1. OXALIS Linn.—F.T.A. 1 : 295.

Plant with well-developed prostrate or ascending stems ; petiole 1–8 cm. long, leaflets deeply obcordate, 5–12 mm. long and broad ; peduncles 1–7 cm. long, 1–5-flowered ; sepals about 4 mm. long ; corolla 8–10 mm. long, yellow ; fruit tomentellous, 1·5–2 cm. long .. .. 1. *corniculata*

Plant acaulous, with the rootstock surrounded by brown bulbils about 4 mm. long ; petiole 15–25 cm. long, leaflets broadly orbicular-obcordate, 1·5–4 cm. long and broad ; peduncles 15–30 cm. long, 5–12-flowered ; sepals 5–7 mm. long ; corolla 12–25 mm. long, pink .. .. 2. *corymbosa*

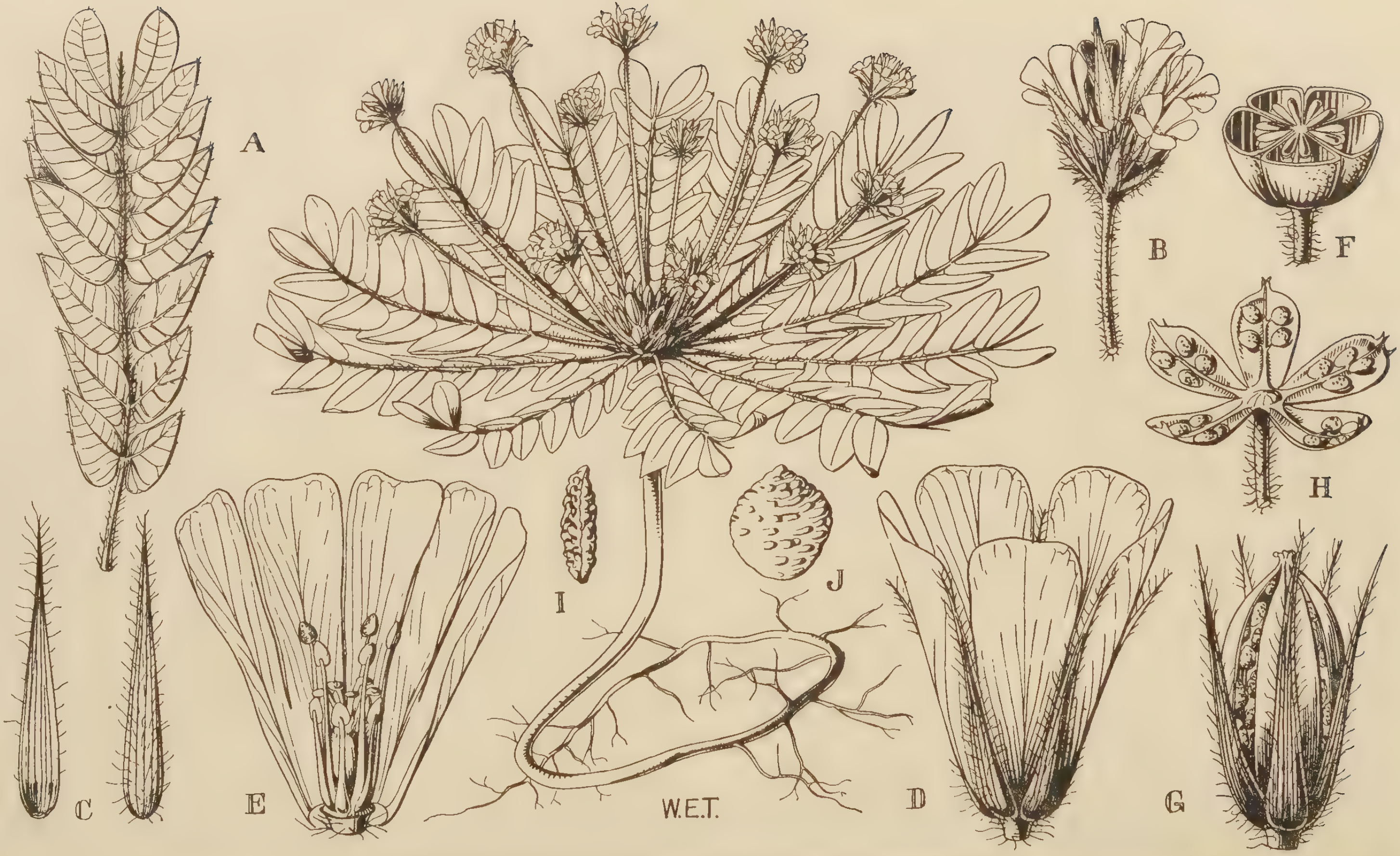

FIG. 59.—BIOPHYTUM PETERSIANUM *Klotzsch* (OXALIDACEAE).

A, leaf. B, flower-cluster. C, sepals, inner and outer face. D, flower. E, the same opened out. F, cross-section of ovary. G, fruit with sepals. H, capsule open. I, seed from the side. J, the same, face view.

1. **O. corniculata** *Linn.*—F.T.A. 1 : 206 ; Chev. Bot. 98 ; R. Knuth in Engl. Pflanzenr. Oxalidac. 146 (1930). A variable, diffuse, slender herb, with the leaves green or reddish-brown ; flowers yellow ; a weed of waste ground, common in most places, but rare in Sierra Leone (*fide* Deighton, 1941).
Fr.G.: Kissi (Feb.) *Chev.* 20762. **S.L.:** Hill Station (May) *Deighton* 3969 ! **Lib.:** *Dinklage* 2604. **Iv.C.:** between Tabou and Beriby (Aug.) *Chev.* 19979. **G.C.:** Kumasi (Jan.) *Dalz.* 63 ! Mampong Scarp (Apr.) *Dalz.* 53 ! Aburi (Mar.) *Deighton* 615 ! **Togo:** *Büttner* 98. **N.Nig.:** Bauchi Plateau (Apr., July) *Lely* 354 ! P. 250 ! **S.Nig.:** Sapoba *Kennedy* 2368 ! Oban *Talbot* 446 ! **Br.Cam.:** Cam. Mt., 3,000–7,600 ft. (all year) *Mann* 2020 ! *Brenan* 9376 ! *Maitland* 1012 ! Kumba (Mar.) *Brenan* 9460 ! Bamenda (Jan.) *Migeod* 292 ! **F.Po:** 8,500 ft. (Dec.) *Mann* 620 ! Cosmopolitan.

2. **O. corymbosa** *DC.* Prod. 1 : 696 (1824). *O. martiana* Zucc. in Denkschr. Akad. Muench. 9 : 144 (1824 ; in the same work Zuccarini also cites *O. corymbosa* DC. with page reference) ; R. Knuth l.c. 250. An ornamental plant, often cultivated, but naturalized around Aburi and Buea ; flowers pink. Fruits apparently not produced ; reproduction by bulbils.
G.C.: Aburi (Mar.) *Deighton* 614 ! **Br.Cam.:** Buea (Jan., Oct.) *Deistel* 150 ; *Maitland* 255 ! *Dundas* FHI 20353 ! Native of America ; introduced to many parts of the world.

2. BIOPHYTUM DC.—R. Knuth in Engl. Pflanzenr. Oxalidac. 391–417 (1930); F.T.A. 1: 297, under *Oxalis* Linn.

Stem unbranched ; median leaflets exceeding 5 mm. long :

Sepals 2–2·5 mm. long ; leaflets membranous, translucent, 6–11 pairs with the apical pair 10–14 mm. long, 5–6 mm. broad and considerably larger than the others, which decrease in size to the base ; leaves 3–6 cm. long ; peduncles 2–7 cm. long 1. *abyssinicum*

Sepals 4–5 mm. long ; leaflets subrigid and opaque :

Annual ; leaves 2–6 cm. long, with 3–8 pairs of leaflets ; median leaflets rectangular-ovate, rounded at apex, 5–8 mm. long and 3–4 mm. broad ; nerves prominent beneath, rhachis pubescent, leaflets glabrous or sparsely pubescent ; peduncles up to 4 cm. long, or inflorescence sessile .. .. 2. *petersianum*

Perennial ; leaves 7–10 cm. long, with 10–20 pairs of leaflets ; median leaflets obliquely rectangular, acute at apex, 8–10 mm. long, 2·5–3 mm. broad, basal leaflets smaller ; lateral nerves numerous, closely parallel and rather prominent beneath, rhachis pubescent, leaflets glabrous ; peduncles up to 1 cm. long, or inflorescence sessile .. .. 3. *talbotii*

Stem branched (except in juvenile stage), woody, perennial ; leaves 3–9 cm. long, with 7–20 pairs of leaflets ; median leaflets oblong to suborbicular, rounded at apex, 2–4 mm. long, 2–3 mm. broad, margins ciliate, lateral nerves faint beneath ; sepals 4–5 mm. long ; peduncle 4–6 cm. long .. .. 4. *zenkeri*

1. **B. abyssinicum** *Steud. ex A. Rich.* Fl. Abyss. 1 : 122 (1847) ; R. Knuth in Engl. Pflanzenr. Oxalidac. 395 (1930). *Oxalis abyssinicum* (Steud. ex A. Rich.) Walp.—F.T.A. 1 : 297. Slender annual ; corolla yellow at base, mauve at tips.
N.Nig.: Bauchi Plateau (July) *Lely* P. 545 ! Mandara Mts. (Aug., Dec.) *E. Vogel* 47 ! *Royer* 147 ! Also in Abyssinia, E. Africa, Nyasaland and Angola.

2. **B. petersianum** *Klotzsch* in Peters Naturwiss. Reis. Mossamb. Bot. 81, t. 15 (1861). *Oxalis apodoscias* Turcz. (1863). *B. apodoscias* (Turcz.) Edgew. & Hook. f. (1874) ; F.W.T.A., ed. 1, 1 : 140 ; Chev. Bot. 98. *Oxalis sessilis* Buch.-Ham. ex Baill. (1886). *B. sessile* R. Knuth l.c. 406 (1930). *Oxalis sensitiva* of F.T.A. 1: 297, partly, not of Linn. Stems slender, short or up to 1 ft. high ; leaves (as in other species) in a terminal crown, sensitive to weather and to touch ; flowers yellow, orange or red. A common weed.
Sen.: Bondou *Heudelot* 149 ! **Fr.Sud.:** Bamako (Jan.) *Chev.* 203 ! **Fr.G.:** Kouroussa (Aug.) *Pobéguin* 396 ! **S.L.:** Bumbuna (Oct.) *Thomas* 3833 ! Kambia (Dec.) *Deighton* 852 ! Makump, N.P. (Aug.) *Deighton* 1377 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Kumawo, Ashanti (June) *Chipp* 466 ! **Togo:** *fide* Knuth *l.c.* **N.Nig.:** Nupe *Barter* 726 ! Naraguta (June) *Lely* 277 ! **S.Nig.:** Lagos (Nov.) *Dawodu* 34 ! *Millen* 14 ! Abeokuta *Irving* ! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 936 ! Buea (Jan., Apr.) *Maitland* 1290 ! Widespread in tropical and subtropical Africa and Asia, and in New Guinea. (See Appendix, p. 39.)

3. **B. talbotii** (*Bak. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 140 (1927) ; Knuth l.c. 406 (1930). *Oxalis talbotii* Bak. f. in Cat. Talb. 16 (1913). *B. kamerunense* Engl. & Knuth ex Engl. Pflanzenw. Afr. 3, 1 : 717 (1915), in obs. Perennial herb with woody stem, up to 1 ft. high ; flowers pink ; on earthbanks of shaded forest streams.
Lib.: Peterstown (Nov.) *Bunting* 103 ! Grand Bassa *Dinklage* 1611. **S.Nig.:** Calabar *Thomson* 24 ! Oban *Talbot* 1409 ! Afi River F.R. (May, Dec.) *Jones* FHI 18930 ! *Keay* FHI 28192 ! Also in French Cameroons.

4. **B. zenkeri** *Guillaumin* in Notulae Syst. 1 : 26 (1906) ; Knuth l.c. 408. Perennial with stout woody stems, to 1 ft. high, becoming well-branched ; flowers yellow ; in rock crevices in river beds in forest.
S.Nig.: Oban *Talbot* 429 ! Kwa Falls, Calabar (Mar.) *Brenan* 9240 ! **Br.Cam.:** Rio del Rey *Johnston* ! R. Ndian (Apr.) *Dunlap* ! Also in French Cameroons, Gabon, Congo and Angola.

R. Knuth l.c. 393, gives the following record for *B. sensitivum* (Linn.) DC. : " Sierra Leone : Felsen des Morro do Bango, *Buchner* 561." This specimen evidently came from Angola and not from Sierra Leone, and the species is not otherwise recorded from our area. It is widespread in east and south tropical Africa and in Asia.

41. BALSAMINACEAE

Succulent herbs ; leaves alternate or opposite, simple, penninerved ; stipules absent. Flowers zygomorphic, hermaphrodite, brightly coloured, solitary to subumbellate. Sepals 3, rarely 5, coloured, imbricate, unequal, the lowermost hollowed out into a spur. Petals 3, the upper one outside, usually erect, concave, the lateral ones often 2-lobed. Stamens 5 ; filaments short and broad ; anthers 2-celled, connate around the ovary. Ovary superior, 5-celled, with axile placentas ; stigmas 1–5, more or less sessile ; ovules numerous. Fruit a succulent capsule, opening elastically into 5 twisted valves. Seeds without endosperm and with straight embryo.

Mostly Asiatic, several in Africa, a few in Europe and North America. Recognized by the zygomorphic brightly coloured flowers with spurred lower sepal and connate anthers.

IMPATIENS Linn.[1]—F.T.A. 1 : 298 ; Warburg in Engl. Bot. Jahrb. 22 : 46–53 (1895) ; Gilg in Engl. Bot. Jahrb. 43 : 97–128 (1909).

Flowers on simple pedicels in the axils of the leaves, sometimes two together :

Lip broadly saccate, abruptly narrowed into the spur which is bent back on to the lip :

Lip broadly tubular-campanulate, about 3 cm. long (from receptacle to mouth of spur) ; spur reflexed, about 1·5 cm. long, straight ; lateral sepals lanceolate, entire ; pedicels about 4 cm. long ; leaves alternate, elliptic-lanceolate, acute at each end, long-petiolate, 10–15 cm. long, 3–5 cm. broad, glabrous or pubescent, crenate, teeth with subulate points almost in the crenatures, becoming larger towards the base and on the petiole .. .. 1. *niamniamensis*

Lip obliquely campanulate, triangular when pressed, 1–1·5 cm. long (from receptacle to mouth of spur) and 2–2·5 cm. broad ; spur 8–12 mm. long ; wings 3–4 cm. long ; lateral sepals ovate, each with denticulations and a pair of appendages ; leaves alternate or subopposite, ovate or elliptic-lanceolate, acute at each end, 8–15 cm. long, 3–8·5 cm. broad, petiole 3–8 cm. long .. .. 2. *zenkeri*

Lip gradually tapered into the straight or curved spur ; spur not bent back on to the lip, but sometimes very shortly reflexed at the tip :

Spur 2 cm. or more long, longer than the limb of the flower :

Petiole short, not exceeding 3 cm. :

Spur 3–4 cm. long ; leaves serrate or serrulate, 8–15 cm. long, 2–3·5 cm. broad ; seeds warty, glabrous :

Spur, stem and lower leaf-surface glabrous ; leaves lanceolate 3. *irvingii* var. *irvingii*

Spur pubescent especially in the upper wide part ; stem and lower surface of leaves rusty pubescent ; leaves elliptic-lanceolate 3a. *irvingii* var. *setifera*

Spur 2 cm. long ; leaves crenate, lanceolate, 9 cm. long, 2 cm. broad ; seeds smooth, sparsely pilose ; flowers, stem and leaves glabrous .. .. 4. *jacquesii*

Petiole 3–7 cm. long ; leaves glabrous, 14–18 cm. long, 3–4 cm. broad ; flowers glabrous :

Spur 6–7 cm. long ; lamina of leaves broadest in the middle ; seeds ellipsoidal, with vermicular hairs .. .. 5. *bennae*

Spur 3·5–4·7 cm. long ; lamina of leaves broadest in the upper third ; seeds narrowly ellipsoidal, glabrous or finely glandular-pubescent .. .. 6. *nzoana*

Spur not, or scarcely, exceeding 1 cm. long, as long as or shorter than the limb of the flower :

Spur, lip and stem, especially in the upper part, more or less densely pilose :

Stems erect, to 1 m. high, not rooting at the nodes ; leaves 4–12 cm. long, 2–5 cm. broad ; lip about 8 mm. long and 1 cm. broad ; wings about 2·5 cm. long 7. *burtoni*

Stems prostrate, rooting freely at the nodes ; leaves 3–5 cm. long, 1·5–2 cm. broad ; lip about 4 mm. long ; wings about 1 cm. long .. 8. *deistelii*

Spur, lip and stem glabrous ; midrib and nerves beneath glabrous to sparingly pilose ; lip 3–5 mm. long and about 1 cm. broad ; wings about 2 cm. long with a broad blade, and long narrow basal portion bearing a small lateral lobe ; lip and spur more or less distinctly mottled or barred .. .. 9. *mannii*

Flowers subumbellate, or racemose, on a common peduncle :

*Lip elongate-conic or trumpet-shaped, gradually narrowed into the relatively short, stout and more or less reflexed spur :

Leaves opposite or whorled, petioles and nerves of the leaves rusty pubescent ; lamina elliptic or ovate-elliptic, cuneate at base, acutely acuminate, 8–16 cm. long, 3–6 cm. broad, deeply crenate with subulate teeth ; lip elongate-conic, gradually narrowed into a short spur with a swollen tip, longitudinally grooved, spur and lip together 2–2·5 cm. long ; wings scarcely longer than mouth of lip .. 10. *sakeriana*

Leaves alternate, glabrous :

Wings narrow, linear, adjacent close to the mouth of the lip, overlapping in front ; lip with a steeply inclined mouth, elongate-conical, 2·5–3·5 cm. long, with a short, thick, abruptly reflexed spur ; inflorescence racemose ; leaves ovate-elliptic, rounded at base, acutely acuminate, 8–12 cm. long, 4–5 cm. broad, crenate, with teeth becoming cilia towards the base .. .. 11. *hians*

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[1] I am grateful to Dr. G. M. Schulze of Berlin for advice in the treatment of this genus for the revised Flora. Most of the material at present available is, however, rather inadequate, and there is a great need for further good collections with flowers preserved in spirit.—R.W.J.K.

Wings large, 3–4 cm. long and 1·5–2 cm. broad ; lip obliquely trumpet-shaped, about 1 cm. long and 1·5 cm. broad, suddenly contracted into a short slender incurved spur ; peduncle 10–20 cm. long ; pedicels about 2 cm. long, subumbellate ; leaves ovate, abruptly cuneate at base, acutely acuminate at apex, 8–15 cm. long, 5–9 cm. broad, coarsely crenate with subulate teeth .. 12. *macroptera*

*Lip short, suddenly narrowed into the long slender spur ; spur not reflexed :

Bracts crowded, imbricate, boat-shaped, about 6 mm. long ; flowers with pedicels 1–1·8 cm. long, borne close together and hence subumbellate at the end of the 8–15 cm. long peduncle ; leaves alternate, ovate-elliptic, setulose-crenate, 4–10 cm. long, 2·5–5 cm. broad .. .. 13. *filicornu*

Bracts separate, not crowded, up to 4 mm. long ; flowers racemose or subcorymbose :

Spur up to 1·5 cm. long; wings up to 1 cm. long; pedicels up to 1·5 cm. long; leaves alternate to subverticillate :

Leaves deeply crenate, long-ciliate at base, oblong-ovate, 3–10 cm. long, 1–3 cm. broad, petiole 2–6 cm. long ; inflorescence 7–9 cm. long, flowers subumbellate near the apex of the peduncle ; pedicels 5–15 mm. long ; bracts about 1 mm. long ; wings about 7 mm. long ; spur about 5 mm. long .. 14. *preussii*

Leaves serrulate with setae, becoming sparsely setose on the margin near the base, ovate, acuminate, 4–11 cm. long, 2–5 cm. broad, petiole 2–2·5 cm. long ; inflorescence 8–12 cm. long, racemose ; pedicels 10–15 mm. long ; bracts 3 mm. long ; wings 8–10 mm. long, deeply lobed ; spur 10–13 mm. long .. 15. *sp. A*

Spur exceeding 1·5 cm. long ; wings exceeding 1 cm. long ; pedicels exceeding 1·5 cm. long :

Inflorescence with numerous flowers densely arranged along an axis 1·5–3 cm. long at the end of a peduncle 5–12 cm. long ; pedicels 1·5–2·5 cm. long ; bracts 3–4 mm. long, deciduous ; wings 1–1·5 cm. long ; spur 1·5–2·5 cm. long ; leaves alternate or opposite or verticillate, ovate, obliquely subacute at base, acuminate, margin serrate or crenate, with setae in the crenatures, 5–17 cm. long, 2·5–7 cm. broad, petiole 2–12 cm. long .. .. 16. *kamerunensis*

Inflorescence lax, with 6–9 flowers arranged along an axis 3–8 cm. long at the end of a peduncle 8–16 cm. long ; pedicels 2–2·7 cm. long ; bracts 2–3 mm. long, persistent ; wings about 1·5 cm. long ; spur 2·5–4·5 cm. long ; leaves sparsely pubescent, ovate-lanceolate, 7–12 cm. long, 4–5 cm. broad, crenate-serrate ; petiole 1–4 cm. long .. .. 17. *obanensis*

1. **I. niamniamensis** *Gilg* in Engl. Bot. Jahrb. 43 : 104 (1909) ; G. M. Schulze in Notizbl. Bot. Gart. Berl. 12 : 733 (1935). *I. bicolor* Hook. f. (1862), not of Royle (1839) ; F.T.A. 1 : 299. *I. dichroa* Hook. f. ex Gilg l.c. (1909), not of Hook. f. (1908) ; F.W.T.A., ed. 1, 1 : 142. Herb 1–3 ft. high, stem stout below ; the spurred sepal forming a long, dark purple, crimson or red sac, other parts of flower greenish-white.

Br.Cam.: Cam. Mt., 3,500–5,500 ft. (Jan.–Apr.) *Mann* 1248 ! *Dunlap* 24 ! *Dundas* FHI 20384 ! *Brenan* 9360 ! *Maitland* 274 ! **F.Po:** Clarence Peak, 4,500 ft. (Dec.) *Mann* 574 ! Moka (Feb.) *Exell* 854 ! Musola (Jan.) *Guinea* 1798 ! Extends through the Belgian Congo to Kenya, Uganda and A.-E. Sudan.

2. **I. zenkeri** *Warb.* in Engl. Bot. Jahrb. 22 : 51 (1895). Erect herb, to 3 ft. high ; flowers white with pink and yellow markings.

Br.Cam.: Bali-Ngemba F.R., Bamenda (May) *Ujor* FHI 30394 ! R. Metschum waterfalls, Bamenda (Jan.) *Keay* FHI 28523 ! Also in French Cameroons. [*Keay* FHI 28523 differs somewhat from typical *I. zenkeri* but appears to be connected by intermediate forms.]

3. **I. irvingii** *Hook. f. ex Oliv.* var. **irvingii**—F.T.A. 1 : 300 (1868) ; Gilg l.c. 111 ; Chev. Bot. 99. Erect herb, 2–4 ft. high, half-aquatic; flowers uniformly red or pink; leaves peculiarly greyish tinted beneath.

Fr.G.: R. Diminkon, Benna (Dec.) *Jac.-Fel.* 2150 ! **S.L.:** *Don !* Kaballa (Sept.) *Thomas* 2333 ! Fundenbaia (Oct.) *Thomas* 2854 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Sampa, Ashanti (Dec.) *Vigne* FH 3485 ! **Dah.:** Avrankou Lagoon (Jan.) *Chev.* 22746. **N.Nig.:** Nupe *Yates* ! **S.Nig.:** Lagos *Millen* 97 ! Abeokuta *Irving* ! R. Ado, Ilaro (Jan.) *Millen* 123 ! Sapoba (Nov.) *Keay* FHI 21505 ! Obu *Thomas* 423 ! **Br.Cam.:** Buea (Feb.) *Dalz.* 8217 !

3a. **I. irvingii** *Hook. f. ex Oliv.* var. **setifera** *A. Chev.* in Bull. Soc. Bot. Fr. 58, Mém. 8 : 143 (1912). *I. villoso-calcarata* Warb. & Gilg ex Gilg in Engl. Bot. Jahrb. 43 : 115 (1909) ; F.W.T.A., ed. 1, 1 : 142. Similar to above, but with a varying amount of rusty pubescence, and often with somewhat broader leaves.

Fr.G.: Konanké country (Feb.) *Chev.* 20810 ! Macenta (Mar.) *Jac.-Fel.* 1556 ! Nzérékoré (Oct.) *Baldwin* 9709 ! **S.L.:** *Afzelius* ! Samu (Dec.) *Sc. Elliot* 4300 ! **Lib.:** *Dinklage* 3365 ! Ganta (Apr.–Nov.) *Harley* ! **Iv.C.:** Dyola country (May) *Chev.* 21541. **N.Nig.:** Ilorin Prov. *Clarke* 15 ! **S.Nig.:** Lagos *Rowland* ! Brass *Barter* 102 ! Angiama *Barter* 2135 !

[There are various forms intermediate between the extreme hairy forms of var. *setifera* and the glabrous var. *irvingii* and I have included these in the var. *setifera*. *I. irvingii* Hook. f. (sensu lato) extends to A.-E. Sudan, Tanganyika and Nyasaland.]

4. **I. jacquesii** *Keay* in Kew Bull. 1953 : 287. *I. jaegeri* Pellegr. & Jac.-Fel. in Bull. Soc. Bot. Fr. 96 : 168 (1950), not of Gilg (1909). *I. petrophila* Gilg & Ledermann in Engl. Pflanzenw. Afr. 5, 1 : 62 (1925), name only. Erect annual, to about 1 ft high ; flowers pink.

Fr.G.: Benna *Jac.-Fel.* 1746. Bilima *Jac.-Fel.* 1828. Mali, Mt. Loura *Jac.-Fel.* 2000. **S.L.:** Loma Mts., 3,200–6,900 ft. *Jaeger* 229 ; 1182 ; 1320 ; 1332 ; 1428 ; 1451 ; 1557 ; 2019. Also in French Cameroons.

5. **I. bennae** *Jac.-Fel.* in Bull. Soc. Bot. Fr. 96 : 170 (1950). Erect branched herb, to 2½ ft. high, entirely glabrous.

Fr.G.: Benna *Jac.-Fel.* 1769.

6. **I. nzoana** *A. Chev.* in Bull. Soc. Bot. Fr. 58, Mém. 8 : 143 (1912). A glabrous herb, simple or branched, up to 2 ft. ; flowers pale rose ; in rocky streams.

Iv.C.: source of R. Nuon, Nzo (Apr.) *Chev.* 21113 !

7. **I. burtoni** *Hook. f.*—F.T.A. 1 : 299. Erect or ascending herb, 2 ft. high ; flowers pink, with green spur veined with purple, throat orange.

Br.Cam.: Cam. Mt., 2,500–5,700 ft. (Dec.–Apr.) *Mann* 1247 ! 1952 ! *Preuss* 574 ! *Brenan* 9337 ! *Dunlap* 18 ! Bamenda, 5,500–5,800 ft. (Jan.) *Migeod* 395 ! *Keay* FHI 28425 ! [*I. eminii* Warb. of Belgian Congo, Uganda and Tanganyika is very close and possibly not specifically distinct.]

8. **I. deistelii** *Gilg* in Engl. Bot. Jahrb. 43 : 108 (1909). Prostrate herb, rooting at the nodes ; flowers pale rose.
Br.Cam.: Cam. Mt., Buea (June) *Deistel* 659 ; 669 !

9. **I. mannii** *Hook. f.*—F.T.A. 1 : 300 ; Gilg l.c. 107. *I. affinis* Warb. in Engl. Bot. Jahrb. 22 : 52 (1895) ; Gilg l.c. 111 ; F.W.T.A., ed. 1, 1 : 142. Straggling herb 2–3 ft. high ; petals white with pink tinge, spur yellow-green at tip, purplish above with more or less distinct transverse bars on the lip.
Br.Cam.: Cam. Mt., 2,500–6,000 ft. (Sept.–Apr.) *Mann* 1258 ! 1953 ! 1954 ! *Preuss* 583 ! 878*b* ! *Dalz.* 8341 ! *Brenan* 9338 ! **F.Po:** 2,000–4,000 ft. (Apr., Dec.) *Mann* 585 ! s.n. ! Moka (Jan.) *Exell* 774 ! Musola (Mar.) *Guinea* 1356 ! [Gilg suggested that *I. affinis* is a hybrid between *I. burtoni* and *I. mannii*, but it appears to me to be only a pubescent form of *mannii* ; the indumentum character is not correlated with the barring of the spur and lip as suggested by Hutch. & Dalz.—R.W.J.K.]

10. **I. sakeriana** *Hook. f.*—F.T.A. 1 : 301 ; Gilg l.c. 102. Stout erect herb, to 9 ft. high, stems straggling at the ends ; flowers deep red, with yellow standard petal marked with two deep crimson blotches.
Br.Cam.: Cam. Mt., 5,000–7,500 ft. (Nov.–Apr.) *Mann* 1256 ! 1970 ! *Maitland* 500 ! 891 ! *Brenan* 9356 ! 9356*a* ! Bamenda, 7,500 ft. (Jan.) *Migeod* 385 ! Near L. Bambulue, Bamenda (Jan.) *Keay* FHI 28361 ! **F.Po:** St. Isabel Peak, 8,000 ft. (Nov.) *Guinea* 2719 ! Also in French Cameroons. (See Appendix, p. 40.)

11. **I. hians** *Hook. f.*—F.T.A. 1 : 301 ; Gilg l.c. 117. Erect herb, to 2 ft; flowers dark red and greenish.
Br.Cam.: Buea, *Preuss* 881 ; 962 ! *Deistel* 41 ! **F.Po:** 1,300–2,000 ft. (Dec.) *Mann* 309 ! 586 ! Also in French Cameroons and Belgian Congo.

12. **I. macroptera** *Hook. f.*—F.T.A. 1 : 301 ; Gilg l.c. 115. Erect herb, 2–4 ft. high ; flowers green and white or purplish.
S.Nig.: Oban *Talbot* 1272 ! Ikom *Rosevear* 73/29 ! **Br.Cam.:** R. Limbe, Victoria (Nov.) *Preuss* 1352 ! Boana to Buea (Aug.) *Preuss* 946. Banti to Babesong *Conrau* 7. **F.Po:** 4,000–5,000 ft. (Apr.) *Mann* 385 ! 1451 ! Also in French Cameroons and Spanish Guinea.

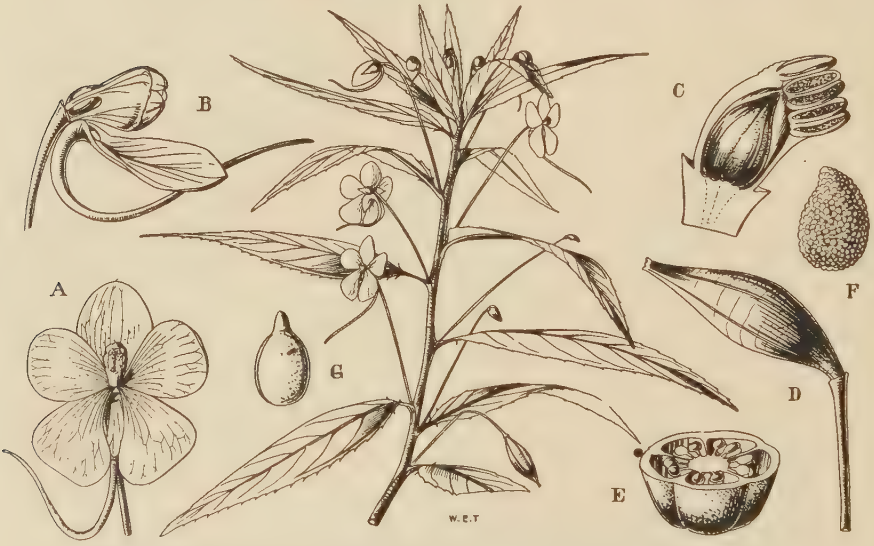

FIG. 60.—IMPATIENS IRVINGII *Hook. f. ex Oliv.* (BALSAMINACEAE).

A, flower. B, flower in partial longitudinal section. C, longitudinal section of flower with sepals and petals removed. D, young fruit. E, cross-section of ovary. F, seed. G, embryo.

13. **I. filicornu** *Hook. f.*—F.T.A. 1 : 302 ; Gilg l.c. 124. *I. baumannii* Warb. l.c. 53 (1895). Slender, glabrous herb, to 2 ft. high ; flowers light purple.
Togo: Misahöhe (Mar.) *Baumann* 95. **Br.Cam.:** Johann-Albrechtshöhe (Mar.) *Staudt* 869. **F.Po:** 4,000–5,000 ft. (Dec.) *Mann* 573 ! Moka (Feb.) *Exell* 860 ! Musola (Jan.) *Guinea* 1781 ! St. Isabel Peak, 6,400 ft. (Feb.) *Guinea* 2620 ! Also in French Cameroons, Spanish Guinea and Belgian Congo.

14. **I. preussii** *Warb.* in Engl. Bot. Jahrb. 22 : 50 (1895) ; Gilg l.c. 103. A slender, generally unbranched, herb, creeping at the base ; flowers small, rose.
Br.Cam.: Buea, 3,300–3,750 ft. (Jan.) *Preuss* 592. Also in French Cameroons.

15. **I.** sp. **A.** Possibly a new species, related to *I. kamerunensis* Warb. Erect herb, to 18 in. high ; flowers magenta-purple.
S.Nig.: Sonkwala, Mt. Koloishe, 5,000 ft. (Dec.) *Savory & Keay* FHI 25066 !

16. **I. kamerunensis** *Warb.* l.c. 51 (1895) ; Gilg l.c. 103. *I. pleistantha* Gilg l.c. 124 (1909). Erect herb, to 3 ft. high ; flowers pink or deep mauve.
Br.Cam.: Buea, 3,300–3,750 ft. (Dec.–Apr.) *Preuss* 590 ! *Deistel* 149 ! *Migeod* 250 ! *Dundas* FHI 15332 ! Cam. Mt., above Mimbia, 4,400 ft. (Apr.) *Brenan* 9362 ! R. Ndian, Ikassa (May) *Rudatis* 9. Banti to Babesong (Nov.) *Conrau* 9. Bangwe (May) *Conrau* 138. Above Widdekum, Bamenda (Jan.) *Keay* FHI 28325 ! Mt. Mba Kokeka, Bamenda, 7,500 ft. (Jan.) *Keay* FHI 28402 ! **F.Po:** Musola (Mar.) *Guinea* 1414 ! *Mildbr.* 7048. Also in French Cameroons. [This appears to be a variable species but more adequate material is needed to decide whether or not several taxa are involved. *Rosevear* 72/29 from Ogoja District, S. Nigeria and *Vigne* 1016 from Tano-Offin F.R., Gold Coast may well be this species also.]

17. **I. obanensis** *Keay* in Kew Bull. 1953 : 287. *I. talbotii* Bak. f. in Cat. Talb. 17 (1913) ; F.W.T.A., ed. 1, 1 : 142 ; not of Hook. f. (1906). Erect herb, to 18 in. high ; flowers rose pink to white.
Togo: Misahöhe (Nov.) *Mildbr.* 7207 ! **S.Nig.:** Oban *Talbot* 430 ! British Obokum (May, Dec.) *Keay* FHI 28280 ! 28285 !

Imperfectly known species.[1]

1. **I.** sp. **B.**
   Fr.G.: Loffa Forest, Macenta *Adam* 3454!
2. **I.** sp. **C.**
   Br.Cam.: Bamenda (Jan.) *Migeod* 412!
3. **I.** sp. **D.**
   Br.Cam.: Bamenda *Lightbody* FHI 26256!
4. **I.** sp. **E.**
   N.Nig.: Bauchi Plateau *Savory* UCI 6!

42. LYTHRACEAE

Herbs, shrubs or trees; leaves opposite or verticillate, rarely alternate; stipules absent or very small. Flowers usually actinomorphic, hermaphrodite, solitary to paniculate. Sepals united into a tube, valvate, sometimes with appendages between the lobes. Petals present or absent, inserted towards the top of the calyx-tube, crumpled in the bud. Stamens usually 4 or 8, or rarely more, inserted below the petals; filaments usually inflexed in bud; anthers 2-celled, opening lengthwise. Ovary superior, sessile or shortly stipitate, completely or incompletely 2–6-celled (rarely 1-celled); style simple, variable in length; ovules numerous, on an axile placenta sometimes not extending to the top of the ovary. Fruit usually capsular, opening by a transverse slit, by valves, or irregularly. Seeds numerous, without endosperm; embryo straight.

Mainly in the tropics. Recognized by the opposite exstipulate simple leaves, tubular calyx with valvate lobes, crumpled petals, insertion of the stamens, superior ovary, and numerous seeds without endosperm.

Shrubs or trees:
  Calyx tubular, 10–12 mm. long; petals very small; capsule valvate; racemes axillary, 1–6-flowered; branchlets not spiny .. .. .. **1. Woodfordia**
  Calyx not tubular, 3–5 mm. long; petals well-developed; capsule indehiscent or tardily bursting irregularly; inflorescence a lax leafy terminal panicle; branchlets often spiny .. .. **2. Lawsonia**
Herbs or suffrutices, never spiny:
  Flowers solitary or subsolitary, sessile or subsessile in leaf axils; fruit a septicidal capsule .. .. **3. Rotala**
  Flowers in cymes, or umbels, or crowded into bracteate heads:
    Septae of ovary interrupted above the placenta which is not, therefore, continuous with the style; fruit a circumscissile capsule; flowers pedicellate in cymes; petals not corrugated in bud, or absent .. .. **4. Ammannia**
    Septae of ovary complete, the placenta consequently continuous with the style; fruit at length opening by valves; flowers in bracteate heads or umbels; petals corrugated in bud, or absent .. .. **5. Nesaea**

Besides the above, *Lagerstroemia indica* Linn. and *L. speciosa* (Linn.) Pers. (syn. *L. flos-reginae* Retz.), both natives of Asia, are frequently cultivated as ornamental shrubs and trees.

1. WOODFORDIA Salisb.—F.T.A. 2: 481.

Much-branched shrub; stem and leaves with small black glands; leaves opposite, ovate-lanceolate or lanceolate, rounded or subcordate at base; subsessile, acuminate, 3–10·5 cm. long, 0·6–3·5 cm. broad; racemes 1–6-flowered, axillary; calyx tubular 10–12 mm. long, constricted above the base, lobes triangular; petals very small; stamens exserted .. .. *uniflora*

W. uniflora (*A. Rich.*) *Koehne* in Engl. Bot. Jahrb. 1: 334 (1881); Engl. Pflanzenr. Lythrac. 80 (1903); Aubrév. Fl. For. Soud.-Guin. 62. *Grislea uniflora* A. Rich. (1847). *W. floribunda* of F.T.A. 2: 481, not of Salisb. Shrub, to 10 ft. high; flowers bright red.
N.Nig.: Pankshin (Dec.) *W. D. MacGregor* 432! Also in French Cameroons, and widespread in E. Africa from Abyssinia to Uganda.

2. LAWSONIA Linn.—F.T.A. 2: 482.

A shrub or small tree, the older branchlets often indurated and spinescent; leaves opposite, elliptic to oblanceolate, acute at each end, up to about 4 cm. long and 2 cm. broad, glabrous, with the midrib impressed above; panicle many-flowered, with leafy bracts; flowers 4-merous, creamy-white, sweet-scented; pedicels about 2 mm. long; petals crumpled in bud; stamens 4–8; fruit globose, about 0·5 cm. diameter, with persistent style .. .. *inermis*

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[1] Some of these specimens may prove to be distinct new species but the material is inadequate to decide.

L. inermis *Linn.*—Koehne in Engl. Pflanzenr. Lythrac. 270, t. 59. *L. alba* Lam.—F.T.A. 2 : 483 ; Chev. Bot. 281. Flowers creamy-white, sweet scented ; widely cultivated as a dye-plant (Henna).
Sen.: *fide* Chev. *l.c.* **Fr.Sud.**: Sikasso *Chev.* 3004 ! Koulikoro (Sept.) Chev. 24991 ! **S.L.**: *Barter* ! Waterloo (May) *Deighton* 2745 ! R. Scarcies, Kitchom (Dec.) *Sc. Elliot* 4314 ! **Lib.**: *Farmar* 344 ! **G.C.**: Aburi (Nov., Dec.) *Johnson* 892 ! 1097 ! **Dah.**: *fide* Chev. *l.c.* **Fr.Nig.**: Zinder *Hagerup* 587 ! **N.Nig.**: Borgu *Barter* 804 ! **S.Nig.**: *Foster* 147 ! Throughout tropical Africa, Asia and Australia. (See Appendix, p. 40.)

3. ROTALA Linn.—F.T.A. 2 : 466 ; Koehne in Engl. Pflanzenr. Lythrac. 24 (1903).

Leaves mostly in threes, linear, narrow at base, up to 13 mm. long and 0·5–1 mm. broad ; stamens 2–3 .. .. 1. *mexicana*

Leaves in pairs, mostly oblong to elliptic, broad at base, over 2 mm. broad ; sometimes with ovate-lanceolate upper leaves and linear leaves towards base of stem (see No. 6) :

  Calyx with subulate appendages between the lobes ; leaves lanceolate-oblong, rounded at apex, 5–10 mm. long, 2–4 mm. broad ; stamens 2–3 .. .. 2. *decussata*

  Calyx without appendages between the lobes :

   Stamens the same number as the sepals, usually 4 ; leaves oblong-elliptic, cordate at base, rounded at apex, 3–10 mm. long, 2–6 mm. broad .. .. .. 3. *tenella*

   Stamens 2 :

    Petals 4 ; capsule oblong, about 3 mm. long ; leaves ovate-lanceolate, subcordate at base, 4–8 mm. long, 2–4 mm. broad .. .. 4. *elatinoides*

    Petals absent ; capsule globose :

     Leaves oblong, cordate or subcordate at base, 3–9 mm. long, 1·5–4 mm. broad 5. *stagnina*

     Upper leaves ovate-lanceolate, obtuse at base, 2–3 mm. long, about 1 mm. broad, lower leaves linear about 5 mm. long and 0·5 mm. broad .. 6. *sp. nr. dinteri*

1. **R. mexicana** *Cham. & Schlechtd.*—Koehne in Engl. Pflanzenr. Lythrac. 29. *R. verticillaris* of F.T.A. 2 : 467, not of Linn. Annual, prostrate, rooting and branched at base, 1–4 in. long ; petals absent or early falling off.
N.Nig.: Nupe *Barter* 898 ! World-wide in the tropics.

2. **R. decussata** *Hiern* in F.T.A. 2 : 467, excl. syn. (1871) ; Koehne l.c. 34 ; Chev. Bot. 279. ? *R. decussata* DC. Much-branched annual, 2–9 in. long ; petals 4 or 0 ; in wet places by streams, etc.
Iv.C.: Nzi valley (Aug.) *Chev.* 22245. **Togo:** Lome *Warnecke* 229 ! **N.Nig.**: Lokoja (Nov.) *Dalz.* 210 ! Also in Angola.

3. **R. tenella** (*Guill. & Perr.*) *Hiern* in F.T.A. 2 : 467 (1871) ; Koehne l.c. 39. *Ammannia tenella* Guill. & Perr. Stems creeping at base, with erect branches, pink ; petals 4, white, soon falling off.
Sen.: Walo (Sept., Oct.) *Perrottet* 333 ! **Fr.Sud.**: Bura (Sept.) *Hagerup* 406 ! Dogo (May) *Davey* 133 ! **Fr.G.**: Toumanea *Pobéguin* 1897 ! **S.L.**: Talla Hills (Feb.) *Sc. Elliot* 4852 ! Kambia (Nov.) *Jordan* 377 ! Bonthe Isl. (Nov.) *Deighton* 2285 ! Also in A.-E. Sudan, Belgian Congo and Transvaal.

4. **R. elatinoides** (*DC.*) *Hiern* in F.T.A. 2 : 466 (1871) ; Koehne l.c. 39 ; Chev. Bot. 279. *Ammannia elatinoides* DC. Annual, creeping with ascending branches 2–4 in. high ; petals 4, white or violet.
Sen.: *Leprieur* ! Walo (Sept.–Feb.) *Perrottet* 332 ! M'bidjem *Thierry* 214 ! **Fr.Sud.**: Dogo (May) *Davey* 132 !

5. **R. stagnina** *Hiern* in F.T.A. 2 : 467 (1871) ; Koehne l.c. 39. Stems reddish, often much-branched, to 6 in. long ; fruits red.
N.Nig.: Kontagora (Jan.) *Meikle* 1040 ! Anara F.R. (Sept., Oct.) *Keay* FHI 20130*a* ! FHI 24400 ! **Br.Cam.**: Wum, Bamenda (Apr.) *Maitland* 1594 ! Also in A.-E. Sudan and Abyssinia. [*Hinds* 5013 from Lawra, Gold Coast is very close to this species, but differs in its shorter style.]

6. **R.** sp. nr. **dinteri** *Koehne ex Schinz*—l.c. 37. Erect, to 3 in. high, stems red, leaves green, flowers white, fruits red ; in wet flushes on rocks.
N.Nig.: Anara F.R. (Oct.) *Keay* FHI 20130 ! [*R. dinteri* Koehne ex Schinz is a S. African species and has a rather shorter style than the Nigerian plant.]

4. AMMANNIA Linn.—F.T.A. 2 : 476 ; Koehne in Engl. Pflanzenr. Lythrac. 42 (1903).

Style ⅓ mm. or more long, filiform ; leaves all markedly auriculate at base ; petals always present :

  Style almost twice as long as ovary ; capsule 2·5–3 mm. diam. ; stamens 4–8 ; cymes lax, with filiform peduncles 6–18 mm. long .. .. .. 1. *auriculata*

  Style shorter than ovary ; capsule about 1·5 mm. diam. ; stamens 4 ; cymes congested, with peduncles 1·5–3 mm. long .. .. 2. *prieureana*

Style very short, not up to ⅓ mm. long ; leaves attenuate to truncate or subcordate, rarely some auriculate ; petals present or absent :

  Leaves all markedly cuneate at base ; calyx without appendages between the lobes in fruit ; petals absent .. .. 3. *baccifera*

  Leaves mostly truncate or subcordate, the lower leaves sometimes cuneate, calyx with small appendages between the lobes in fruit ; petals 0–4 :

   Stamens 8 .. .. 4. *gracilis*

   Stamens 4 .. .. 5. *senegalensis*

1. **A. auriculata** *Willd.*—Koehne in Engl. Pflanzenr. Lythrac. 46 (1903). *A. auriculata* var. *auriculata* Koehne l.c. *A. senegalensis* of F.T.A. 2 : 477 and of F.W.T.A., ed. 1, 1 : 144, partly. Erect herb, 1–2 ft. high ; flowers pink ; in marshy places.
Sen.: *fide* Koehne *l.c.* **Fr.Sud.**: Sarédina (May) *Davey* 136 ! **S.L.**: Kambia (Dec., Jan.) *Sc. Elliot* 4446 ! *Deighton* 864 ! **N.Nig.**: Sokoto (Oct.) *Dalz.* 418 ! *Lely* 119 ! Birnin Gwari (fr. Dec.) *Meikle* 1586 ! Jebba (Dec.) *Hagerup* 696 ! Bauchi Plateau (Oct.) *Lely* P. 788 ! Tangale (Oct.) *Lely* 661 ! Abinsi *Dalz.* ! Also in Egypt, N.E. and E. tropical Africa.

2. **A. prieureana** *Guill. & Perr.*—Koehne l.c. 48. *A. senegalensis* of F.T.A. 2 : 477 and of F.W.T.A., ed. 1, 1 : 144, partly. *A. auriculata* var. *arenaria* (H. B. & K.) Koehne l.c. 46. Erect herb, to 2 ft. high ; flowers mauve ; in marshy places.
Sen.: *Leprieur* ; *Perrottet* 331 ! s.n. ! *Talmy* ! **Gam.**: *Boteler !* *Dawe* 32 ! **S.L.**: Falaba (Mar.) *Sc. Elliot* 5096 ! **Togo:** Lome *Warnecke* 300 ! **N.Nig.**: Sokoto (Nov.) *Moiser* 225 ! Minna (fr. Dec.) *Meikle*

1585! Anara F.R. (Mar.) *Olorunfemi* FHI 24421! **S.Nig.:** Ikirun (Feb.) *Millson*! Obudu (Dec.) *Keay & Savory* FHI 25003! Also in tropical E. Africa.

3. **A. baccifera** *Linn.*—Koehne l.c. 53; F.T.A. 2: 478. *A. baccifera* subsp. *baccifera*—Koehne l.c. 54. *A. aegyptiaca* of F.W.T.A., ed. 1, 1: 144, not of Willd. *A. salicifolia* of F.T.A. 2: 478, partly, not of Monti. *A. attenuata* Hochst. ex A. Rich.—Koehne l.c. 53. *A. senegalensis* of F.W.T.A., ed. 1, 1: 144, partly. Erect herb, to 2 ft. high; flowers mauve; at edges of pools.

G.C.: Dukwesein, N. Agogo (Dec.) *Chipp* 615! **N.Nig.:** Yola (Jan.) *Dalz.* 176! **S.Nig.:** Awba Hills (Dec.) *Jones* FHI 5981! Cross R., Obokum (Jan.) *Holland* 260! Widespread in tropical Africa, Asia and Australia.

4. **A. gracilis** *Guill. & Perr.*—Koehne l.c. 52. *A. diffusa* of F.T.A. 2: 479, not of Willd.; Chev. Bot. 280. *A filiformis* of Chev. Bot. 280, not of DC. (*fide* Hutch. & Dalz.). Stem prostrate, rooting at the base, with slender branches, about 1 ft. high; petals purple-violet to reddish-white.

Sen.: R. Casamance (Apr.) *Perrottet* 335! **Fr.Sud.:** Nafadié (Jan.) *Chev.* 154. Folo (May) *Chev.* 840. **Fr.G.:** Kollangui (Mar.) *Chev.* 15077. Also in Ubangi-Shari-Chad. [Chevalier's specimens cited here were all seen by Hutchinson, but have not been seen for this revision.]

5. **A. senegalensis** *Lam.*—Koehne l.c. 52; F.W.T.A., ed. 1, 1: 144, in part only. *A. senegalensis* var. *filiformis* (DC.) Hiern—F.T.A. 2: 477. *A. salsuginosa* Guill. & Perr.—F.T.A. 2: 477. Erect or procumbent herb, to 1 ft. high; in marshy places.

Sen.: M'bidjem *Thierry* 212! 213! 216! Walo (Sept.–Nov.) *Perrottet* 334! *Heudelot*! **Fr.Sud.:** Sarédina (May) *Davey* 98! **S.L.:** *Sc. Elliot*! **N.Nig.:** Kadara, Katagum (Jan.) *Dalz.* 310! Also in N.E. Africa.

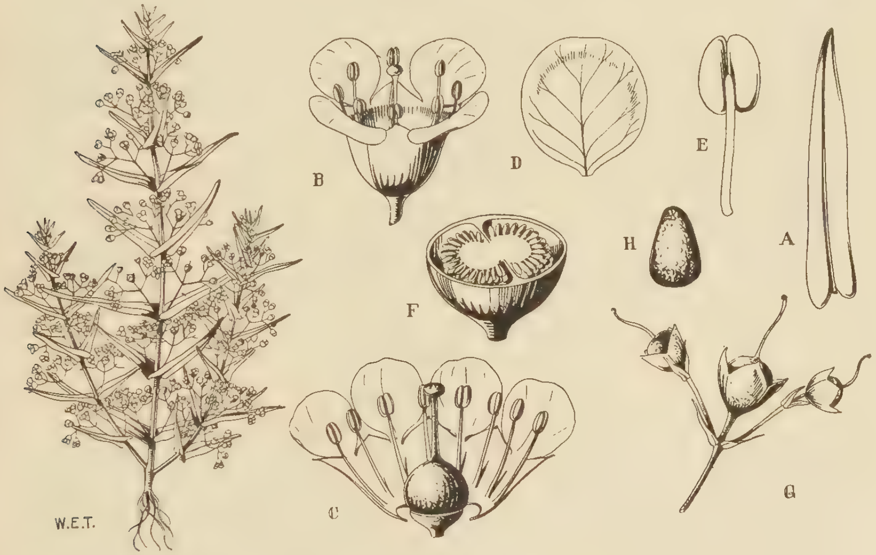

FIG. 61.—AMMANNIA AURICULATA *Willd.* (LYTHRACEAE).

A, leaf. B, flower. C, flower laid open. D, petal. E, stamen from behind. F, cross-section of ovary. G, fruits. H, seed.

5. NESAEA Commers. ex H. B. & K.—F.T.A. 2: 470; Koehne in Engl. Pflanzenr. Lythrac. 221 (1903).

Flowers not congested into bracteate heads:
  Stems thick and spongy, often rooting from the lower nodes, neither angular nor winged; leaves obovate-oblanceolate, narrowed to base, rounded at apex, 10–40 mm. long, 5–20 mm. broad, glabrous; peduncles up to 15 mm. long; petals present 1. *crassicaulis*
  Stems wiry, often angular or winged:
    Calyx less than 2 mm. long, appendages between the lobes conspicuous; petals absent; leaves lanceolate to oblong-lanceolate, 7–27 mm. long, 3–7 mm. broad; peduncle 2–3 mm. long .. .. 2. *aspera*
    Calyx 3–4 mm. long, appendages absent or very minute; petals present, relatively large:
      Peduncle less than 5 mm. long; stamens 12–14; leaves linear-lanceolate, 10–65 mm. long, 1·5–5 mm. broad .. .. 3. *dodecandra*
      Peduncle 12–25 mm. long; stamens 20–30; leaves ovate to lanceolate, 20–55 mm. long, 5–12 mm. broad .. .. 4. *mossiensis*
Flowers numerous and congested into heads subtended by leafy bracts:
  Leaves distinctly cordate at base, sessile, ovate to lanceolate, 5–20 mm. long, 6–10 mm. broad; plant erect; flowers about 5 in each head, subtended by 2 large bracts acute at apex .. .. 5. *cordata*

Leaves not cordate at base :
  Leaves oblong-lanceolate, 8–22 mm. long, 2–5 mm. broad ; stems more or less erect ; flowers 3–7 in each head, subtended by 2 large bracts acute at apex .. 6. *erecta*
  Leaves oblong-elliptic to oblong-lanceolate, 10–37 mm. long, 4–22 mm. broad ; stems long and mostly decumbent ; flowers numerous in each head, subtended by two large bracts, obtuse or rounded at apex .. .. 7. *radicans*

1. **N. crassicaulis** (*Guill. & Perr.*) *Koehne* in Engl. Bot. Jahrb. 3 : 324 (1882) ; Engl. Pflanzenr. Lythrac. 225 (1903). *Ammannia crassicaulis* Guill. & Perr.—F.T.A. 2 : 479 ; F.W.T.A., ed. 1, 1 : 144 ; Chev. Bot. 279. Stem erect or ascending, up to 1 ft. long ; flowers purple-violet ; in marshes and streams.
   Sen.: Cayor (Mar.–May) *Perrottet* 337 ! M'bidjem (Dec.) *Chev.* 15769 ! **Fr.Sud.**: Bilma (Dec.) *E. Vogel* ! Also in Angola, Zanzibar and Madagascar.
2. **N. aspera** (*Guill. & Perr.*) *Koehne* in Engl. Bot. Jahrb. 3 : 327 (1882) ; Pflanzenr. 226. *Ammannia aspera* Guill. & Perr.—F.T.A. 2 : 480 ; F.W.T.A., ed. 1, 1 : 144. Erect or ascending, branched near the base, 3–6 in. high ; in damp places.
   Sen.: near Cape Verde (Mar.) *Perrottet* 338 ! Also in Angola.
3. **N. dodecandra** (*DC.*) *Koehne* in Engl. Bot. Jahrb. 3 : 334 (1882) ; Pflanzenr. 234. *Ammannia dodecandra* DC. (1826). *N. candollei* Guill. & Perr. (1830–33)—F.T.A. 2 : 473 ; Chev. Bot. 280. Erect, branched herb, 1–2 ft. high ; in inundated meadows, etc.
   Sen.: Richard Tol (Sept.–Dec.) *Perrottet* 58 ! 129 ! 339 ! *Heudelot* !
4. **N. mossiensis** *A. Chev.* in Bull. Soc. Bot. Fr. 58 Mém. 8 : 171 (1912); Chev. Bot. 280. Undershrub or suffrutex, erect shoots to 2 ft. high, sparingly branched ; petals and stamens bright scarlet ; in inundated meadows etc.
   Fr.Sud.: Mossi Prov. (July) *Chev.* 24540 ! **Fr.G.**: *Maclaud* ! Kollangui (Mar.) *Chev.* 12194 ! Diaguissa (Apr.) *Chev.* 13549 ! Kouroussa (Mar.) *Pobéguin* 196 ! **N.Nig.**: Maska, Katsina (June) *Hubbard* T. 138 ! *Keay* FHI 25888 ! Kakangi (July) *Keay* FHI 25929. [This species is very close to *N. icosandra* Kotschy & Peyr. (see F.T.A. 2 : 471) from Ubangi and A.-E. Sudan and may prove conspecific when better known.]
5. **N. cordata** *Hiern* in F.T.A. 2 : 475 (1871) ; Koehne in Engl. Pflanzenr. Lythrac. 232 ; Chev. Bot. 280. Erect annual, to 8 in. high ; flowers pink or red ; in damp places.
   Fr.Sud.: Bamako (Nov.) *Waterlot* 1464 ! **Iv.C.**: Toumodi (Aug.) *Chev.* 22389 ! **N.Nig.**: Borgu *Barter* 763 ! Lokoja (Oct.) *Dalz.* 194 ! Widespread in tropical and S. Africa.
6. **N. erecta** *Guill. & Perr.*—F.T.A. 2 : 474 ; Koehne l.c. 231 ; Chev. Bot. 280. Annual, 2–10 in. high, much-branched ; flowers purple.
   Sen.: Casamance *Heudelot* 565 ! St. Louis (Oct.) *Leprieur* 9 ! Cayor (Mar.) *Perrottet* 342 ! 343 ! **Gam.**: *Ingram* ! **Fr.Sud.**: Koulikoro (Oct.) *Chev.* 15762. Bamako (Nov.) *Waterlot* 1442 ! **N.Nig.**: Anchau (Nov.) *Keay* FHI 21671 ! Widespread in tropical Africa and Madagascar.
7. **N. radicans** *Guill. & Perr.*—F.T.A. 2 : 474 ; Koehne l.c. 231 ; Chev. Bot. 280. Stems up to 4 ft. long.
   Sen.: *Farmar* 58 ! *Talmy* ! Cayor (Oct.–Mar.) *Perrottet* 341 ! Niayes (Dec.) *Chev.* 15768 ! M'bidjem (Dec.) *Chev.* 15769 ! **Gam.**: *Brown-Lester* 11 ! 32 ! Also in Angola, E. Africa and Madagascar.

43. ONAGRACEAE

By J. P. M. Brenan

Herbs, sometimes shrubs, very rarely trees. Leaves alternate, opposite or rarely whorled, simple ; petiole not inflated in middle. Stipules absent or small. Flowers solitary and axillary, sometimes aggregated into racemes or panicles, normally hermaphrodite, regular or rarely irregular. Sepals valvate, mostly 4, sometimes 5, rarely 2, 3, 6 or 7. Petals free, as many as sepals, contorted or imbricate, rarely absent. Stamens as many or twice as many as sepals, very rarely fewer. Ovary inferior, mostly 4-celled, rarely 1–7-celled. Style simple. Ovules axile, one to many per cell. Fruit a capsule, rarely a nut or a berry. Seeds without endosperm.

Mostly in the Northern Hemisphere. Recognized by the inferior ovary, valvate sepals, definite number of stamens, and seeds without endosperm.

Seeds with an apical tuft of silky hairs ; sepals caducous after flowering ; petals (in our species) white to cream, often tinged pink later .. .. 1. **Epilobium**
Seeds without any hairs ; sepals persistent after flowering ; petals (in our species) yellow .. .. 2. **Jussiaea**

1. EPILOBIUM Linn.—F.T.A. 2 : 486.

Stem appressed grey-puberulous ; leaves lanceolate to oblong-linear, cuneate to narrowly rounded at base, obtuse or subacute at apex, 2–8 cm. long, 3–14 mm. broad, petiole usually 1·5–4·5 mm. long, margins and veins usually appressed-grey-puberulous ; flowers nodding ; sepals 4·5–7·5 mm. long ; petals 6–11·5 mm. long, 3–4·5 (–7) mm. broad, elliptic or narrowly obovate-elliptic ; style 3·5–7 mm. long ; stigma variable in shape, usually oblong to ellipsoid, more rarely obovoid, entire or nearly so, 2–3·5 mm. long, 0·7–1·5 mm. broad ; capsule 3–8 cm. long ; pedicels 1·3–4·5 cm. long *salignum*

E. salignum *Hausskn.* in Oesterr. Bot. Zeitschr. 29 : 90 (1879) ; Hausskn. Monogr. Epilobium 236 (1884) ; Brenan in F.T.E.A. Onagrac. 5, t. 1 (1953). *E. neriophyllum* Hausskn. Herbaceous or thinly woody, to 5 ft. high, often branched above ; flowers white or cream, often pink-tinged later.
Br.Cam.: Banso, Bamenda (Oct.) *Tamajong* FHI 23474 ! Also in French Cameroons, eastern and southern Africa, and in Madagascar.

2. JUSSIAEA Linn.—F.T.A. 2 : 488 ; Munz in Darwiniana 4 : 179–284 (1942) ; Brenan in Kew Bull. 1953 : 163. *Ludwigia* Linn.—F.T.A. 2 : 490 ; F.W.T.A., ed. 1, 1 : 146.

*Floating roots absent from the nodes :

†Seeds in 2 or more longitudinal rows from the base to the apex of each cell of the capsule, free (i.e. not enclosed in or surrounded by endocarp) ; sepals mostly 3–4, if 5 then capsule almost always 12 mm. long or less :

‡Raphe much narrower than the body of the seed :

Stamens 8 (–10) :

Plant always pubescent or pilose ; seeds 0·75–0·8 mm. long ; capsule often 2–4 cm. long ; petals 6–16 mm. long .. .. 1. *stenorraphe*

Plant glabrous (at least in African specimens) ; seeds 0·3–0·5 mm. long, 0·2–0·3 mm. broad ; capsule not exceeding 2 cm. long :

Leaves with petiole 3–15 mm. long ; stems strongly angled ; sepals 3–6 mm. long ; petals 4–5 mm. long .. .. 2. *erecta*

Leaves sessile or subsessile ; stems narrowly winged ; sepals 7–10 mm. long ; petals 8–12 mm. long .. .. 3. *decurrens*

Stamens 3–4 (–5) :

Sepals 4–5 ; capsule not, or scarcely, tapering to the apex and there 2–4 mm. diam. ; plant usually erect ; leaves lanceolate to linear, 1·5–9 cm. long, 1·5–15 mm. broad .. .. 4. *perennis*

Sepals 3 (–4) ; capsule normally tapering to the apex and there less than 2 mm. diam. ; plant usually prostrate ; leaves obovate to oblanceolate :

Ovary and stem (under × 20 lens) puberulous ; seeds pale brown ; leaves mostly shortly obovate ; capsule often shorter and more oblong than in *senegalensis* .. .. 5. *pulvinaris*

Ovary and stem (under × 20 lens) glabrous or nearly so ; seeds red-purple or red-brown ; leaves usually oblanceolate .. .. .. 6. *senegalensis*

‡Seeds each with an enlarged raphe almost as large as the body of the seed :

Leaves mostly lanceolate to linear-lanceolate, those subtending flowers 2–10 mm. broad, gradually tapering towards the apex, not parallel-sided ; more or less spreading-hairy, sometimes densely so, on stems, leaves and young shoots, or sometimes the spreading hairs on young shoots only
7a. *suffruticosa* var. *brevisepala*

Leaves linear, those subtending flowers 1–2 (–3) mm. broad, more or less parallel-sided :

Leaves and stem puberulous, appearing subglabrous, sometimes with a few spreading hairs on young parts only .. .. .. 7b. *suffruticosa* var. *linearis*

Leaves and stem more or less plentifully clothed with long spreading hairs
7c. *suffruticosa* var. *piloso-linearis*

†Seeds in a single row in each cell, or in a single row in the lower part and in 2 or more rows in the shorter upper part of the capsule ; sepals 4–5 :

Capsule mostly with a slightly enlarged cylindrical apical portion in which the seeds are free and in 2 or more rows in each cell ; seeds in lower, longer portion in a single row in each cell, almost pendulous and each enclosed in a piece of endocarp ; sepals 4, 2–3·5 mm. long ; petals about 3 mm. long ; stamens 8 ; ovary minutely puberulous (× 20 lens essential) .. .. 9. *linifolia*

Capsule mostly not enlarged towards the apex, always with the seeds in a single row throughout each cell :

Seeds free (i.e. not enclosed in or surrounded by endocarp), pendulous ; sepals 6–8 mm. long, 1·2–1·5 mm. broad at base ; capsule 4–4·5 cm. long, 1·5 mm. diam. ; pedicels 8–14 mm. long .. .. 8. *gracilis*

Seeds each enclosed in or surrounded by a piece of endocarp, horizontal (except in *repens*) :

Sepals 3–14 mm. long ; petals 5–24 mm. long ; stamens 8–10 (–14) ; capsule 2·5–4 mm. diam. (except in *africana*) :

Capsule 2·5–4 mm. diam. ; sepals often 5 or more ; petals often more than 5 mm. long :

Sepals 5–14 mm. long :

Leaves with 11–20 lateral nerves on each side of midrib ; capsule marked on outside with little bumps 0·5 mm. apart corresponding to the seeds inside ; seeds horizontal, each surrounded by, but free within, a horseshoe-shaped piece of endocarp, the actual seed 0·8–1 mm. long .. 10. *leptocarpa*

Leaves with 6–12 lateral nerves on each side of midrib ; capsule marked on outside with little bumps 1·5–2 mm. apart corresponding to the seeds inside ; seeds pendulous, each enclosed by and firmly attached to its piece of endocarp, the actual seeds 1–1·5 mm. long ; plant creeping or floating
14. *repens* var. *diffusa*

Sepals 3·5–5 mm. long ; plant more or less densely spreading pilose ; leaves usually elliptic with 10–25 lateral nerves on each side of midrib ; capsule densely hairy ; seeds horizontal .. .. 11. *affinis*

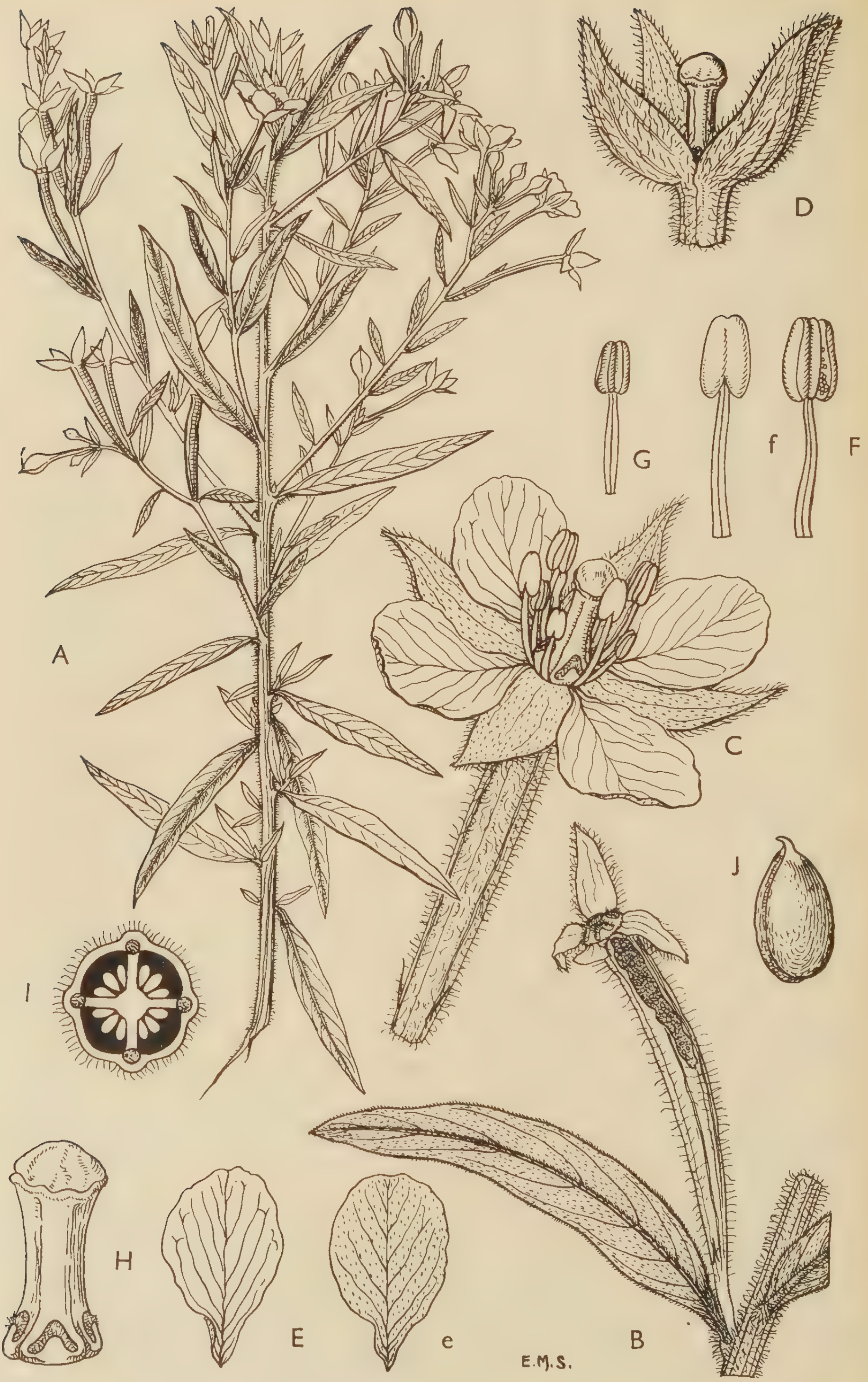

FIG. 62.—JUSSIAEA STENORRAPHE *Brenan* (ONAGRACEAE).

A, part of plant, × ⅔. B, partly dehisced capsule with its subtending leaf, × 2. C, flower, × 3. D, flower, after removal of petals and stamens, × 3. E & e, petal, inner and outer faces, × 3. F & f, antepetalous stamen, inner and outer faces, × 6. G, antesepalous stamen, inner face, × 6. H, style and stigma, × 6. I, transverse section of ovary, diagrammatic, × 20. J, seed, × 40.

Capsule 1·5–2·5 mm. diam., puberulous ; sepals 4, 3–4·5 mm. long ; petals about 5 mm. long ; pedicels 3–8 mm. long .. .. 12. *africana*
Sepals 1·75–3 mm. long ; petals 1·5–3·5 mm. long ; stamens 4 (–5) ; capsule 1–2 mm. diam. ; ovary and stem glabrous .. .. .. 13. *abyssinica*
*Floating, white or pink, spongy, inflated roots produced from the nodes ; see above 14. *repens* var. *diffusa*

1. **J. stenorraphe** *Brenan* in Kew Bull. 1953 : 164 ; Brenan in F.T.E.A. Onagrac. 10, t. 2, 1, t. 3 (1953). *J. villosa* of F.W.T.A., ed. 1, 1 : 146, partly. *J. suffruticosa* Linn. var. *stenosperma* Berhaut in Bull. Soc. Bot. Fr. 99 : 323 (1953). Shrubby, or less often herbaceous, 3–10 ft. high ; sepals often turning bright red within after the petals fall.
Fr.Sud.: Nafadié (Jan.) *Chev.* 159 ! **Fr.G.:** Kouroussa (Dec.) *Pobéguin* 601 ! **G.C.:** Birrifwa, N.W. Dist. (Feb.) *Kitson* ! **Togo:** Kpedsu (Dec.) *Howes* 1043 ! **Dah.:** *fide* Berhaut *l.c.* **N.Nig.:** Zaria (Dec.) *Meikle* 834 ! Anara F.R. (Mar.) *Olorunfemi* FHI 24424 ! Kaduna (Nov.) *Keay* FHI 28113 ! Bauchi Plateau (Sept., Oct.) *Lely* 574 ! P. 846 ! Lokoja *Barter* ! Yola (Oct.) *Shaw* 96 ! **S.Nig.:** Eruwa *Rowland* ! Widespread in tropical Africa, with three other variants in E. Africa.

2. **J. erecta** *Linn.* Sp. Pl. 388 (1753) ; Munz in Darwiniana 4 : 195 (1942) ; Berhaut l.c. 322 (1953) ; Brenan in F.T.E.A. Onagrac. 12, t. 2, 2 (1953). *J. acuminata* Sw., not of F.W.T.A., ed. 1, 1 : 146. *J. altissima* Perr. ex DC. Prod. 4 : 55 (1828) ; Guill. & Perr. Fl. Seneg. 1 : 293 (1833). *J. linifolia* of F.W.T.A., ed. 1, 1 : 146 (excl. *Brown-Lester* 10).
Sen.: *Perrottet* ! *Farmar* 41 ! **Fr.Sud.:** Timbuktu (July) *Chev.* 1276 ! 1277 ! *Hagerup* 163c ! **S.L.:** Laminaiya (Apr.) *Thomas* 142 ! Mange, Bure (Jan.) *Deighton* 1036 ! **Fr.Nig.:** Daddara (Dec.) *Meikle* 818 ! **N.Nig.:** R. Niger *Barter* 823 ! **S.Nig.:** Ibadan (Apr.) *Meikle* 1420 ! R. Ogbesse, Akinjare (Apr.) *Jones* FHI 3099 ! R. Shasha, Etemi (May) *Tamajong* FHI 16781 ! R. Osse, Iguoriakhi (Jan.) *Brenan* 8928 ! Widespread in tropical Africa, Madagascar, Mascarene Islands, and in tropical America.

3. **J. decurrens** (*Walt.*) *DC.* Prod. 3 : 56 (1828) ; Munz l.c. 198. *Ludwigia decurrens* Walt. Erect annual herb.
Gam.: *Saunders* 5 ! **S.Nig.:** R. Waiya, Ikom (Dec.) *Keay* FHI 28289 ! Atan Eki, Itu (Jan.) *Jones* FHI 5039 ! Cross R., Ikot Okpora (Apr.) *Akpata* FHI 3934 ! Native of tropical and subtropical America.

4. **J. perennis** (*Linn.*) *Brenan* in Kew Bull. 1953 : 163 ; Brenan in F.T.E.A. Onagrac. 13, t. 2, 4 (1953). *Ludwigia perennis* Linn. *Ludwigia parviflora* Roxb.—F.T.A. 2 : 490 ; Trochain in Bull. Soc. Bot. Fr. 82 : 144 (1935). *Isnardia multiflora* Guill. & Perr. Fl. Seneg. 1 : 295. Annual herb ; capsules 12 mm. long or less.
Sen.: *Perrottet* 320. Richard Tol *Leprieur* ! Walo (Jan.) *Perrottet* ! Bakel (Sept., Oct.) *Heudelot* 328. Also in Chad, A.-E. Sudan, E. Africa and Madagascar ; widespread in tropical Asia, the Philippines and New Caledonia ; possibly in Australia.

5. **J. pulvinaris** (*Gilg*) *Brenan* l.c. 163 (1953). *Ludwigia pulvinaris* Gilg—F.W.T.A., ed. 1, 1 : 146 ; Trochain l.c. 144 (1935). Small prostrate herb.
Fr.Sud.: Tiguiberri (Jan.) *Chev.* 295 ! Island in R. Niger, between Bourem and Bamba (Mar.) *Leclerq* 42321; *Chev.* 42947. **Fr.G.:** Kouria (Oct.) *Caille* 15027. **S.L.:** Njala (Mar.) *Deighton* 3370 ! Also in Belgian Congo (?), Rhodesia and Angola.

6. **J. senegalensis** (*DC.*) *Brenan* l.c. 164 (1953). *Prieurea senegalensis* DC. *J. ? prieurea* Guill. & Perr. *Ludwigia prieurea* (Guill. & Perr.) Trochain l.c. 142–3 (1935). *Ludwigia senegalensis* (DC.) Trochain Contrib. Vég. Sénégal 378 (1940). Small prostrate herb.
Sen.: *Leprieur* ! Dangana *Leprieur.* Matam (Nov.) *Trochain* 992. **Fr.Sud.:** Koulikoro (Oct.) *Chev.* 15774. Dogo (May) *Davey* 128 ! **S.L.:** Mange, Bure (Dec.) *Jordan* 723 ! Also in A.-E. Sudan.

7. **J. suffruticosa** *Linn.* Sp. Pl. 388 (1753) ; Munz l.c. 235. *J. villosa* Lam.

7a. **J. suffruticosa** var. **brevisepala** *Brenan* in Kew Bull. 1953 : 168 ; Brenan in F.T.E.A. Onagrac. 14, t. 2, 5 (1953). *J. villosa* Lam. of F.W.T.A., ed. 1, 1 : 146, partly. Herb, to 4 ft. high ; sepals 3·5–6 mm. long, 1·5–3·25 mm. broad ; petals 5–8 mm. long, 3–4·5 mm. broad.
Gam.: Wallikunda (Aug.) *Macluskie* ! **S.L.:** Mahera (Nov.) *Deighton* 5683 ! Njala (Oct.) *Deighton* 2808 ! Baoma (Apr.) *Deighton* 3167 ! Yonibana (Oct., Nov.) *Thomas* 4059 ! 4741 ! **Lib.:** Bushrod Isl. (Dec.) *Barker* 1101 ! **G.C.:** Kumasi (Dec.) *Darko* 481 ! **N.Nig.:** Sokoto (Sept., Nov.) *Moiser* 43 ! Birnin Gwari (Apr.) *Meikle* 1381 ! Naraguta *Lely* 28 ! **S.Nig.:** Lagos *Millen* 106 ! Ibadan (Jan., Mar.) *Meikle* 945 ! *Keay* FHI 25693 ! Oke-Opin, Ilorin (Dec.) *Ajayi* FHI 19279 ! Oban *Talbot* 445 ! **Br.Cam.:** R. Cameroon (Jan.) *Mann* 2227 ! Victoria (June) *Maitland* 55 ! Wum, Bamenda (Apr.) *Maitland* 1593 ! Widespread in tropical Africa.

7b. **J. suffruticosa** var. **linearis** (*Willd.*) *Oliv. ex O. Ktze.* Rev. Gen. Pl. 1 : 251 (1891) ; Brenan in F.T.E.A. Onagrac. 15 (1953). *J. linearis* Willd. ; Berhaut l.c. 323 (1953). *J. villosa* Lam.—F.W.T.A., ed. 1, 1 : 146, partly. Herb to 4 ft. high ; sepals 3–5 mm. long, 1–2 mm. broad ; petals 3–4 mm. long, 2–2·5 mm. broad.
Sen.: M'bidjem *Thierry* 80 ! Dakar (May) *Baldwin* 5749 ! **Gam.:** *Ruxton* 24 ! **Fr.Sud.:** Nafadié (Jan.) *Chev.* 158 ! **Fr.G.:** *Pobéguin* 446 ! Ditinn (Apr.) *Chev.* 12946 ! **Lib.:** Grand Bassa *T. Vogel* 5 ! **G.C.:** Aboma F.R. (Nov.) *Vigne* 3448 ! Accra (May) *Irvine* 697 ! **Fr.Nig.:** Niamey *Hagerup* 531 ! **N.Nig.:** Lokoja (Sept.) *Parsons* L. 15 ! Lemme (May) *Lely* 93 ! Abinsi (Nov.) *Dalz.* 766 ! 767 ! **S. Nig.:** Olokemeji (June) *Jones & Keay* FHI 18820 ! Widespread in tropical Africa, and in Madagascar.

7c. **J. suffruticosa** var. **piloso-linearis** *Brenan* in Kew Bull. 1953 : 169 ; Brenan in F.T.E.A. Onagrac. 15 (1953). *J. villosa* Lam.—F.W.T.A., ed. 1, 1 : 146, partly. Herb, similar to var. *linearis*, but more or less densely pilose.
Togo: *Baumann* 246 ! **S.Nig.:** Abeokuta *Irving* 71 ! R. Ogbesse, Akinjare (Apr.) *Jones* FHI 3110 ! Also in Belgian Congo and Kenya.

8. **J. gracilis** *Brenan* in Kew Bull. 1953 : 170. Herb, from a few to 30 in. high ; petals pale yellow.
Togo: Kpandu *Robertson* 66 !

9. **J. linifolia** *Vahl* Eclog. Amer. 2 : 32 (1798) ; Munz l.c. 250 ; F.W.T.A., ed. 1, 1 : 146, partly (*Brown-Lester* 10 only) ; Berhaut in Bull. Soc. Bot. Fr. 99 : 321 (1953). *J. acuminata* of F.W.T.A., ed. 1, 1 : 146, partly, not of Sw. Erect herb, much branched, to 2 ft. high, rarely more.
Sen.: *fide* Berhaut *l.c.* **Gam.:** *Brown-Lester* 10 ! *Pirie* 47 ! **S.L.:** *Barter* ! Mange, Bure (Jan.) *Deighton* 1035 ! Diamain (Apr.) *Adames* 37 ! Port Loko (Dec.) *Thomas* 6513 ! Yonibana (Oct., Nov.) *Thomas* 4209 ! 4244 ! **Lib.:** Monrovia (Nov.) *Dinklage* 3250 ! Duport (Nov.) *Linder* 1488 ! Bumbuma (Oct.) *Linder* 1320 ! **G.C.:** Sekondi (Oct.) *Howes* 987 ! Pra R. *Irvine* 433 ! Aboma F.R. (Nov.) *Vigne* 3447 ! **S.Nig.:** Lagos *Millen* 149 ! Okomu F.R. (Feb.) *Brenan* 9192 ! Idah (Sept.) *T. Vogel* 72 ! Onitsha (Feb.) *Jones* FHI 521 ! Cross R. *Johnston* ! Also in Ubangi, French Cameroons, Gabon, Belgian Congo, S. Tomé, and widespread in the tropics.

10. **J. leptocarpa** *Nutt.* Gen. N. Amer. Pl. 1 : 279 (1818) ; Munz l.c. 254 ; Berhaut l.c. 321 (1953) ; Brenan in F.T.E.A. Onagrac. 16, t. 2, 6 (1953). *J. pilosa* H. B. & K. ; F.W.T.A., ed. 1, 1 : 146, partly. Herb, sometimes slightly woody, to 6 ft. high ; with numerous, sometimes dense, spreading hairs, especially on young parts.
Sen.: *fide* Berhaut *l.c.* **S.L.:** Diamain (Apr.) *Adames* 38 ! Rokupr (Apr.) *Adames* 164 ! **N.Nig.:** *Barter* 1554 ! Daura (Apr.) *Meikle* 1362 ! Baga Seyoram, L. Chad (Jan.) *Davey* FHI 27134 ! **S.Nig.:** Lagos (June) *Dalz.* 1255 ! Okomu F.R. (Dec.) *Brenan* 8588 ! Sapoba (Mar., Aug.) *Jones* FHI 732 ! 4959 ! Cross R., Itu (Jan.) *Jones* FHI 6195 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 829 ! Widespread in tropical Africa and in tropical and subtropical America.

11. **J. affinis** *DC*. Prod. 3 : 53 (1828) ; Munz l.c. 259. *J. pilosa* of F.W.T.A., ed. 1, 1 : 146, partly (*Sc. Elliot* 4368 and *Thomas* 7626 only). Herbaceous, or shrubby, to 4 ft. high or more.
S.L.: Samu (Dec.) *Sc. Elliot* 4368 ! Port Loko (Dec.) *Thomas* 6525 ! 6548 ! Kenema (Jan.) *Thomas* 7522 ! 7626 ! **Lib.:** Nyaake, Webo (June) *Baldwin* 6173 ! Brewersville (June) *Barker* 1324 ! **Iv.C.:** Man (Jan.) *Schnell* 4021 ! Native of tropical America.

12. **J. africana** *Brenan* in Kew Bull. 1953 : 171. Habit uncertain, probably herbaceous, at least 1½ ft. high ; flowers often several together on short lateral branchlets, often aggregated into a leafy panicle.
S.L.: *Burbridge* 540 ! Also in French Cameroons and Spanish Guinea.

13. **J. abyssinica** (*A. Rich.*) *Dandy & Brenan* in F. W. Andr. Fl. Pl. A.-E. Sudan 1 : 145 (1950) ; Brenan in F.T.E.A. Onagrac. 18, t. 2, 7, t. 4 (1953). *Ludwigia abyssinica* A. Rich. *J. acuminata* of F.W.T.A., ed. 1, 1 : 146, partly. Herb or weak shrub, straggling or erect, to 10 ft. high, much branched ; flowers characteristically appearing as though in axillary clusters.
Fr.G.: Kouria *Chev.* 15012 ! Nzérékoré (Oct.) *Baldwin* 9734 ! **S.L.:** Port Loko (Dec.) *Thomas* 5849 ! 6522 ! Yonibana (Nov.) *Thomas* 4779 ! 4939 ! Magbile (Dec.) *Thomas* 5886 ! Yetaya (Sept.) *Thomas* 2292 ! **Lib.:** Kakatown *Whyte* ! Gbanga (Sept.) *Linder* 507 ! Zeahtown, Tchien (Aug.) *Baldwin* 6953 ! **G.C.:** Kwahu (Jan.) *Irvine* 1733 ! R. Kakum, Assuansi (Mar.) *Irvine* 1548 ! Kumasi (Feb.) *Darko* 521 ! **N.Nig.:** Anara F.R. (Oct.) *Keay* FHI 20123 ! Lokoja (Mar.) *Shaw* 20 ! Bauchi Plateau (Jan., Sept.) *Lely* 568 ! P. 131 ! **S.Nig.:** Lagos *Millen* 52 ! *MacGregor* 103 ! Enugu *Jones* FHI 708 ! **Br.Cam.:** Rio del Rey *Johnston* ! Lakom, Bamenda (May) *Maitland* 1448 ! Widespread in tropical Africa, also in Natal, Zululand and Madagascar.

14. **J. repens** *Linn.* Sp. Pl. 388 (1753) ; Munz l.c. 270.
J. repens var. **diffusa** (*Forsk.*) *Brenan* in Kew Bull. 1953 : 171 ; Brenan in F.T.E.A. Onagrac. 19, t. 2, 8 (1953). *J. diffusa* Forsk.—F.T.A. 2 : 488 ; F.W.T.A., ed. 1, 1 : 146. *J. stolonifera* Guill. & Perr. Fl. Seneg. 1 : 292 (1833). *J. pilosa* of F.W.T.A., ed. 1, 1 : 146, partly (*Chev.* 1273 ; 1275). *J. repens* of Berhaut in Bull. Soc. Bot. Fr. 99 : 321 (1953). Herb creeping and rooting at nodes, or more often floating in water.
Sen.: *Perrottet* ! **Gam.:** *Hayes* 532 ! **Fr.Sud.:** Mopti (May) *Hagerup* 76 ! Timbuktu (July) *Chev.* 1273 ! 1275 ! **S.L.:** Gbap (Apr., June) *Adames* 23 ! 51 ! **G.C.:** Botchiano *Irvine* 1030 ! Accra to Prampram (Apr.) *Irvine* 2841 ! **Dah.:** *Le Testu* 225 ! **Fr.Nig.:** Mayatiki (May) *Lean* 33 ! **N.Nig.:** Sokoto (Mar.) *Dalz.* 521 ! Bauchi Plateau (May, July) *Lely* 172 ! P. 149 ! P. 560 ! Katagum (Jan.) *Dalz.* 302 ! Odeko, Kabba Prov. *Jones* FHI 2843 ! **S.Nig.:** Lagos (Oct.) *Moloney* ! Widespread in the Near East and Africa ; the typical plant is widespread in tropical Asia, and other varieties are in America.

44. TRAPACEAE

By J. P. M. Brenan

Aquatic floating herbs. Leaves alternate, floating, rosetted, only present at the upper nodes ; stipules small, scarious, cleft to base and thus apparently more than two per leaf ; petiole spongy and more or less inflated about the middle ; lamina rhombic to deltoid. Adventitious roots (?) submerged, paired but not opposite, one from either side of leaf-scar, chlorophyllose and thus leaf-like, pinnatisect into many filiform segments. Flowers solitary from upper axils, pedunculate, hermaphrodite, regular. Sepals, petals and stamens 4, latter perigynous. Petals white. Ovary half-inferior, bilocular ; ovules pendulous, one per loculus. Fruit a one-seeded, top-shaped drupe ; pericarp soon disappearing ; endocarp very hard, variously 2–4-horned, the horns derived from the persistent sepals.

Clearly related to and probably derived from *Onagraceae*, but so distinct in its morphology that it is better as a separate family. The germination is very remarkable, one cotyledon only being exposed, the other remaining within the pyrene (endocarp)—see Hegi, Ill. Fl. Mitteleuropa 5, 2 : 889 (1925) for illustration.

The family has only the following genus.

TRAPA Linn.—F.T.A. 2 : 491.

Annual ; leaves with lamina often broader than long, 1·5–4·5 cm. long, 1·5–7 cm. broad, toothed in upper part, glabrous above, beneath varying from almost glabrous to densely hairy all over ; sepals about 4–7 mm. long ; petals white, obovate-oblong to obovate, about 8–16 mm. long ; fruit 2–4-horned, the horns very variable in shape, size and direction .. .. *natans*

T. natans *Linn.* Sp. Pl. 120 (1753) ; Hegi Ill. Fl. Mitteleuropa 5, 2 : 884 (1925) ; Brenan in F.T.E.A. Trapac. (1953).

T. natans var. **bispinosa** (*Roxb.*) *Makino* in Iinuma, Somoku-Dzusetzu, ed. 3, 1 : 137 (1907). *T. bispinosa* Roxb.—F.T.A. 2 : 491 ; F.W.T.A., ed. 1, 1 : 146 (probably). Fruits always 2-horned, horns from upper angles, sharp, reflexedly barbed below points, erecto-patent to almost horizontal, straight or slightly curved.
Port.G.: Bafata by R. Geba (fr. June) *Esp. Santo* 2263 ! **N.Nig.:** Yola, in pools (Mar.) *Dalz.* 67 !

The solitary W. African specimen placed under *T. bispinosa* Roxb. in the F.W.T.A., ed. 1, 1 : 146, *Dalz.* 67, lacks fruits so its identification is uncertain, but it is probably var. *bispinosa*. I consider *T. bispinosa* Roxb. best regarded as *T. natans* var. *bispinosa* (Roxb.) Makino. The aggregate species has a very wide discontinuous range through Europe, Asia and Africa ; it is naturalized in N. America and Australia ; more widespread in Tertiary times than to-day.

45. HALORAGACEAE

Herbs or undershrubs, often aquatic ; leaves alternate, opposite or verticillate, sometimes very large, the submersed ones often much divided ; stipules absent. Flowers hermaphrodite or unisexual, solitary to paniculate or corymbose, often very small. Calyx-tube adnate to the ovary ; lobes 2–4 or absent. Petals 3–4 or absent, valvate or slightly imbricate. Stamens 2-8, rarely 1, large ; anther basifixed, 2-celled, opening lengthwise. Ovary inferior, 1–4-celled ; styles 1–4 ; ovules as many as the styles, pendulous from the apex of the cells. Fruit small, a nut or drupe, sometimes winged, indehiscent or rarely breaking up into cocci. Seeds pendulous, with copious endosperm and straight fairly large (rarely small) embryo.

A small family, widely spread and usually found in damp or boggy places. Only two species represented in our area.

LAUREMBERGIA Berg.—Schindler in Engl. Pflanzenr. Halorrh. 61 (1905) ; F.T.A. 2 : 405 as *Serpicula* Linn.

Stem and leaves pubescent, especially when young, or glabrous ; flowers minute, up to about 11 in each leaf axil ; leaves alternate or opposite, linear or linear-oblanceolate, entire, or very minutely serrate towards the apex, 10–13 mm. long and 1 mm. broad .. .. 1. *engleri*

Stem and leaves densely white-villous all over ; flowers up to 7 in each leaf-axil ; leaves opposite, oblong or obovate, with one tooth on each margin near the apex, or tricuspidate, about 12 mm. long and 4 mm. broad .. .. 2. *villosa*

1. **L. engleri** *Schindler* in Engl. Pflanzenr. Halorrh. 73, fig. 21 (1905). Creeping herb in marshy ground ; stems reddish, flowers greenish-yellow or brownish.
G.C.: Atwabo, W.P. (Feb.) *Irvine* 2296 ! (possibly distinct ?). **N.Nig.:** Nupe *Barter* 1665 ! Bida (Mar.) *Meikle* 1326 ! Also in A.-E. Sudan.
2. **L. villosa** *Schindler* l.c. (1905). A minute undershrub in damp ground.
Sen.: M'boro *Perrottet* 742; *Leprieur.*

Mildbraed in Wiss. Ergebn. 1910–11, 2 : 189 (1922) records also *Tessmann* 2890 from Moka, Fernando Po, which he identifies as *L. cf. tetrandra* (Schott) Kanitz, a species of N. Africa and S. America (see Schindler l.c. 74).

46. THYMELAEACEAE

Trees, shrubs or rarely herbs ; leaves opposite or alternate, entire, often small and ericoid ; stipules absent. Flowers actinomorphic, usually hermaphrodite, sometimes capitulate. Calyx tubular, more or less cylindric, sometimes long and slender ; lobes 4–5, imbricate. Petals present or absent, sometimes very small, mostly inserted at the mouth of the calyx-tube. Stamens as many or twice as many as the calyx-lobes, inserted in the calyx-tube ; anthers 2-celled, opening lengthwise. Disk hypogynous or absent. Ovary superior, 1–2-celled ; ovule solitary in each cell, pendulous ; style simple ; stigma entire. Fruit a nut, drupe or pyrene, usually enclosed in the base of the calyx-tube. Seeds with or without endosperm ; embryo straight.

Mainly South African, Mediterranean and Australian. Recognized by the woody habit, absence of stipules, actinomorphic tubular often coloured calyx, and reduced or absent petals.

Petals large and conspicuous, mostly as long as the calyx-lobes and often deeply divided ; leaves very oblique, acuminate ; flowers solitary, or 2–4 together, in leaf-axils 1. **Dicranolepis**

Petals absent, or very small and scale-like :
- *Flowers not capitate, in axillary clusters, umbels or racemes :
  - Calyx divided nearly to the base ; petals present, scale-like in pairs opposite the sepals .. .. 2. **Octolepis**
  - Calyx tubular :
    - Petals present, fused into a ring at the mouth of the calyx-tube 3. **Synaptolepis**
    - Petals absent :
      - Inflorescence pedunculate ; ovary 2-celled ; calyx-tube rather broad and cylindrical, with very short, broad lobes .. .. 4. **Peddiea**
      - Inflorescence not pedunculate ; ovary 1-celled ; calyx-tube slender, with linear lobes .. .. 5. **Craterosiphon**

*Flowers capitate, surrounded by an involucre of bracts :
  Calyx-lobes 4 ; calyx-tube glabrous, or shortly and sparingly pubescent :
    Petals present, sometimes very small ; stamens slightly exserted from the calyx-tube .. 6. **Gnidia**
    Petals absent ; stamens included in the calyx-tube .. .. 7. **Arthrosolen**
  Calyx-lobes 5 ; calyx-tube densely long-villous ; petals present, rarely absent ; stamens shortly exserted from the calyx-tube .. .. .. 8. **Lasiosiphon**

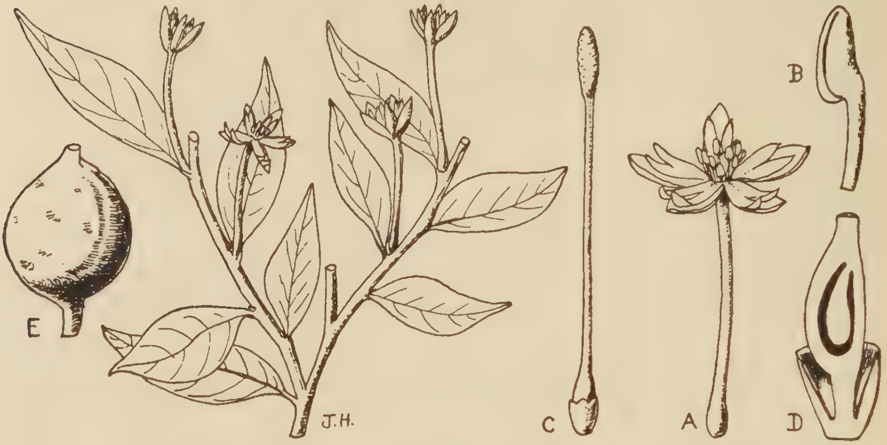

FIG. 63.—DICRANOLEPIS DISTICHA *Planch.* (THYMELAEACEAE).
A, flower. B, stamen. C, ovary with style. D, ovary and tubular disk in vertical section. E, fruit.

1. DICRANOLEPIS Planch.—F.T.A. 6, 1 : 238 ; Staner in Bull. Jard. Bot. Brux. 13 : 326 (1935).

Calyx with stalked glands ; calyx-tube 4–5 cm. long, calyx-lobes about 1 cm. long ; petals 15–18 mm. long ; stigma club-shaped ; leaves obliquely oblong-ovate, caudate-acuminate, 10–20 cm. long, 4·5–7·5 cm. broad .. .. .. 1. *glandulosa*
Calyx without stalked glands ; calyx-tube generally less than 4 cm. long ; leaves generally less than 12 cm. long :
  Calyx glabrous outside or only sparsely pubescent ; petals shorter than calyx-lobes :
    Calyx-tube 8–10 mm. long, calyx-lobes 5–6 mm. long ; stigma discoid or capitate ; leaves obliquely oblong or ovate, caudate-acuminate, 5–12 cm. long, 3–5·5 cm. broad .. .. 2. *buchholzii*
    Calyx-tube 20–32 mm. long, calyx-lobes 6–10 mm. long ; stigma club-shaped or capitate ; flowers solitary, or 2–4 together ; leaves obliquely rhomboid-elliptic, caudate-acuminate, 2–9 cm. long, 1–3·5 cm. broad .. .. 3. *disticha*
  Calyx densely hairy outside :
    Stigma discoid or capitate :
      Petals longer than calyx-lobes ; calyx-tube 30–40 mm. long, calyx-lobes 12–14 mm. long ; petals 15–22 mm. long ; anthers well exserted ; bracteoles subulate ; leaves obliquely rhomboid, caudate-acuminate, 5–8 cm. long, 1·5–3·5 cm. broad 4. *grandiflora*
      Petals shorter than calyx-lobes ; calyx-tube 15–25 mm. long, calyx-lobes 8–12 mm. long ; petals 6–10 mm. long ; anthers only just exserted ; bracteoles ovate or ovate-lanceolate ; leaves obliquely elongate-rhomboid, caudate-acuminate, 5–10 cm. long, 1·5–3 cm. broad .. .. 5. *vestita*
    Stigma club-shaped :
      Leaves fairly large, about 8–10 cm. long and 2–4 cm. broad ; petals much exceeding the calyx-lobes ; calyx-tube 25–30 mm. long, calyx-lobes striate about 10 mm. long ; petals 16–20 mm. long .. .. 6. *persei*
      Leaves smaller, up to 7 cm. long and 2·5 cm. broad ; calyx-lobes and petals subequal :
        Segments of the petals entire ; calyx-tube very slender, 25–27 mm. long, calyx-lobes and petals about 8 mm. long ; leaves very obliquely rhomboid-lanceolate, 2·5–3·5 cm. long, about 1 cm. broad .. .. 7. *polygaloides*
        Segments of the petals more or less toothed ; leaves obliquely ovate, 4–7 cm. long, 1·5–2·5 cm. broad :
          Calyx-tube 25–30 mm. long, glabrous inside .. .. .. 8. *laciniata*
          Calyx-tube about 20 mm. long, pubescent inside .. .. 9. *pubescens*

1. **D. glandulosa** *H. H. W. Pearson* in F.T.A. 6, 1 : 242 (1910). Shrub or treelet, with horizontal branches ; flowers white.
Br.Cam.: Bibundi (Nov.) *Mildbr.* 10652 ! Also in French Cameroons.

2. **D. buchholzii** *Engl. & Gilg*—F.T.A. 6, 1 : 241. Low shrub or treelet, 3 ft. high.
Br.Cam.: R. Mungo *Buchholz.* Likomba (Nov.) *Mildbr.* 10691 ! Johann-Albrechtshöhe *Staudt* 803 !

3. **D. disticha** *Planch.*—F.T.A. 6, 1 : 243 ; Chev. Bot. 545 ; Staner in Bull. Jard. Bot. Brux. 13 : 329 (1935). *D. mannii* Baill.—F.T.A. 6, 1 : 242 ; F.W.T.A., ed. 1, 1 : 148. *D. stenosiphon* H. H. W. Pearson in F.T.A. 6, 1 : 240 ; F.W.T.A., ed. 1, 1 : 148. Shrub or treelet, 3–10 ft. high ; calyx pale green outside ; inside of calyx-lobes, and petals, stamens and style white, becoming cream.
Fr.G.: *fide* Chev. *l.c.* **S.L.:** *Afzelius* ! *Don* ! *Unwin & Smythe* 17 ! Njala (Oct.–Jan.) *Dalz.* 8058 ! *Deighton* 1413 ! 2404 ! Yonibana (Nov.) *Thomas* 4876 ! **Lib.:** Gbanga (Sept.) *Linder* 661 ! **Iv.C.:** *fide* Chev. *l.c.* **S.Nig.:** Okomu F.R. (fl. Dec.–Jan., fr. Feb.) *Brenan* 8567 ! 8836 ! 9060 ! Owhy (Dec.) *Holland* 179 ! Eket *Talbot* 3314 ! Oban *Talbot* 2312 ! **Br.Cam.:** R. Cameroon (Jan.) *Mann* 2199 ! **F.Po:** (Jan.) *Mann* 217 ! Also in French Cameroons, Gabon and Belgian Congo.

4. **D. grandiflora** *Engl.* –F.T.A. 6, 1 : 240. *D. talbotiorum* S. Moore. Shrub or treelet, to 16 ft. high. with horizontally spreading branches and large, erect, white flowers ; fruit orange.
G.C.: Okroase (Dec.) *Johnson* 457 ! S. Scarp F.R. (Dec.) *Moor* 1150 ! **Togo:** Oboghan Hill *Hughes* FH 2984 ! **S.Nig.:** Lagos *Punch* ! Okomu F.R. (Dec.) *Brenan* 8448 ! Sapoba (Nov.) *Meikle & Keay* 556 ! *Kennedy* 2745 ! Degema *Talbot* 3693 ! Oban *Talbot* 1273 ! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 473 ! **F.Po:** (Dec.) *Mann* 23 ! (See Appendix, p. 42.)

5. **D. vestita** *Engl.*—F.T.A. 6, 1 : 241. Shrub or treelet, to 10 ft. high ; calyx green outside with white indumentum ; petals and calyx-lobes within cream ; fruits apricot-yellow, long-beaked.
S.Nig.: Oban *Talbot* 1273*a* ! 1280 ! R. Ata, Sonkwala, 4,000 ft. (Dec.) *Savory & Keay* FHI 25059 ! **Br.Cam.:** Cam. Mt., 2,000–4,500 ft. (fl. Dec.–Feb., fr. May) *Mann* 1214 ! 2161 ! *Maitland* 667 ! 1313 ! *Deistel* 278 ! **F.Po:** *Mann* ! Moka (Jan.) *Guinea* 2082 !

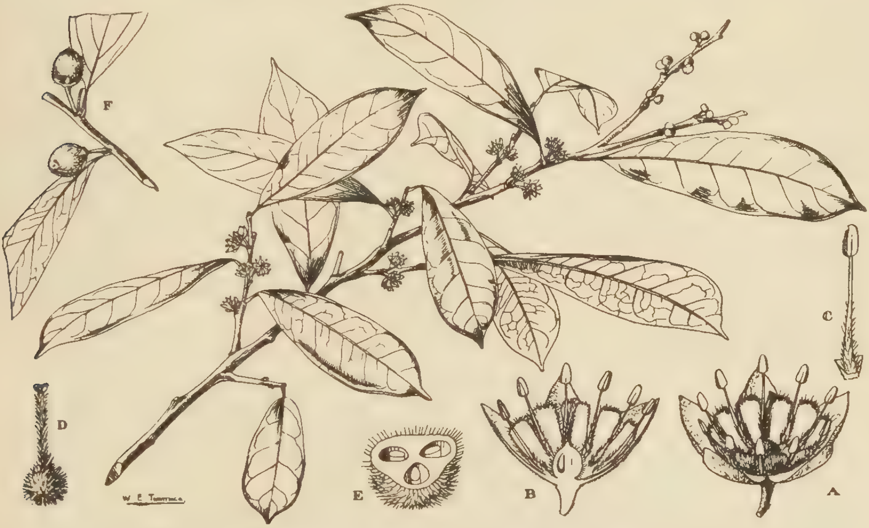

FIG. 64.—OCTOLEPIS DECALEPIS *Gilg* (THYMELAEACEAE).

A, open flower showing the scale-like petals. B, longitudinal section of same. C, stamen. D, pistil. E, cross-section of ovary. F, fruits.

6. **D. persei** *Cummins*—F.T.A. 6, 1 : 242 ; Chev. Bot. 545. Shrub 4–6 ft., or up to 15 ft. high ; flowers white.
Iv.C.: *fide* Chev. *l.c.* **G.C.:** Kumasi (Apr.) *Cummins* 186 ! *Vigne* 1115 ! Juaso (Dec.) *Dalz.* 111 ! Kwahu Plateau (Apr.) *Kitson* 1042 ! Akim (Feb.) *Glover* 10 ! Ankasa F.R. (Dec.) *Vigne* 3170 ! (See Appendix, p. 42.)

7. **D. polygaloides** *Gilg ex H. H. W. Pearson* in F.T.A. 6, 1 : 243 (1910). Shrub ; flowers white.
Br.Cam.: R. Mungo *Schlechter* 12889 ! S. Bakossi F.R. (May) *Olorunfemi* FHI 30562 ! Also in French Cameroons.

8. **D. laciniata** *Gilg*—F.T.A. 6, 1 : 243. Shrub with white flowers.
Lib.: *Harley* ! Nikabuzu to Zigida (Mar.) *Bequaert* 130 ! **Togo:** Misahöhe *Baumann* 481 !

9. **D. pubescens** *H. H. W. Pearson* in F.T.A. 6, 1 : 243 (1910). Shrub, with young branches densely pubescent, later glabrous.
Fr.G.: Kassa, near the Sierra Leone boundary *Sc. Elliot* 5066 !

2. OCTOLEPIS Oliv.—F.T.A. 6, 1 : 252.

Sepals 5 ; leaves rather narrowly oblong-elliptic, more or less gradually triangular-acuminate, very shortly cuneate at base ; lateral nerves about 6–7 pairs, prominently looped .. .. 1. *decalepis*

Sepals 4 ; leaves rather broadly obovate or obovate-elliptic, rather abruptly caudate-acuminate, gradually narrowed from above the middle to the base ; lateral nerves 8–14 pairs .. .. 2. *casearia*

1. **O. decalepis** *Gilg*—F.T.A. 6, 1 : 253 ; Chev. Bot. 546 ; Staner in Bull. Jard. Bot. Brux. 13 : 325 (1935). A low shrub with glabrous grey-brown branches ; flowers white ; by river banks in inundated forest.
Lib.: Grand Bassa (Sept.–Oct.) *Dinklage* 2044 ! R. Farmington (Dec.) *Bequaert* 8 ! **Iv.C.:** Guidéko (May) *Chev.* 16387 ! Also in Belgian Congo.

2. **O. casearia** *Oliv.*—F.T.A. 6, 1 : 254. *O. dinklagei* Gilg and *O. macrophylla* Gilg—F.T.A. 6, 1 : 253–4. Shrub or treelet, 6–10 ft. high ; flowers white ; fruits green, nodding, dehiscent with shining black, pubescent seeds.
S.Nig.: R. Calabar, near Calabar (Feb.) *Mann* 2306 ! *Brenan* 9228 ! **Br.Cam.:** S. Bakundu F.R. (fl. & fr. Mar.) *Brenan* 9270 ! 9321 ! Johann-Albrechtshöhe *Staudt* 838. Also in French Cameroons and Spanish Guinea.

3. **SYNAPTOLEPIS** Oliv.—F.T.A. 6, 1 : 245.

A low glabrous shrub ; branches sparingly leafy, purplish ; leaves elliptic-obovate, shortly cuneate at base, often widely retuse at apex, up to 6 cm. long and 2·5 cm. broad, with a thick recurved margin, tawny beneath, with numerous raised lateral nerves ; calyx-tube 15–18 mm. long, gradually expanded to about 1·5 mm. diam. at the mouth, calyx-lobes oblong-ovate, about 2 mm. long and 1 mm. broad ; petals scale-like and ciliate ; stamens in two whorls, the lower included in the calyx-tube, the upper just exceeding the petals ; fruit ovoid about 15 mm. long, enclosed in the persistent calyx-tube, and capped by the slender upper style-like portion of the calyx-tube and lobes.. .. .. *retusa*

S. retusa *H. H. W. Pearson* in F.T.A. 6, 1 : 247 (1910) ; Chev. Bot. 546. Suffrutex, with stout woody stock, and erect shoots to 18 in. high ; stem and leaves pale glaucous green ; flowers pale green with golden anthers ; on dry stony soil in savannah.
Fr.G.: *Farmar* ! *Pobéguin* 2109 ! Dougoura *Chev.* 338 ! Kollangui (Mar.) *Chev.* 12211 ! Labé (Mar.) *Chev.* 12368 ! **Dah.:** Atacora Mts. *Chev.* 24034 ! **N.Nig.:** Utachu to Madengyen, Kontagora (Jan.) *Meikle* 1068 !

4. **PEDDIEA** Harv.—F.T.A. 6, 1 : 248.

Flowers 10–16 mm. long ; peduncle 6–40 mm. long ; pedicels about as long as the flowers ; leaves oblanceolate, rather obtusely acuminate, 6–15 cm. long, lateral nerves rather ascending .. .. 1. *fischeri*
Flowers 5–6 mm. long ; peduncle about 10 mm. long ; pedicels longer than the flowers ; leaves lanceolate-elliptic, acute at each end, 5–9 cm. long, lateral nerves spreading 2. *parviflora*

1. **P. fischeri** *Engl.*—F.T.A. 6, 1 : 249 ; Staner in Bull. Jard. Bot. Brux. 13 : 337 (1935). *P. longiflora* Gilg—F.T.A. 6, 1 : 249 ; F.W.T.A., ed. 1, 1 : 149. *P. zenkeri* Gilg—F.T.A. 6, 1 : 252. *P. parviflora* of Chev. Bot. 546, not of Hook. f. Shrub or small tree ; flowers white to yellowish green ; used in live fences in Bamenda.
Fr.G.: Fouta Djalon (Mar.) *Chev.* 18041 ! Dalaba-Diaguissa Plateau (Oct.) *Chev.* 18791 ! Foot of Mt. Nimba (fl. & fr. Sept.) *Schnell* 3636 ! **Togo :** Assuma (Oct.) *Büttner* 287 ! Bismarckburg (Sept.) *Büttner* 220. Konkoa (July) *Büttner* 481. **Br.Cam.:** Bamenda : Babungo (Dec.) *Ledermann* 1970. Bali (May) *Ujor* FHI 30390 !

2. **P. parviflora** *Hook. f.*—F.T.A. 6, 1 : 251. A tree, 15–20 ft. high ; flowers greenish-white.
F.Po: 5,000 ft. (Nov.) *Mann* 567 !

5. **CRATEROSIPHON** Engl. & Gilg—F.T.A. 6, 1 : 248.

A glabrous climbing shrub ; leaves often subopposite, oblong-elliptic, shortly cuneate at base, obtusely acuminate, 6–9 cm. long, 2·5–4 cm. broad, with numerous lateral nerves spreading almost at right angles ; petiole 5–6 mm. long ; flowers 3–6 in the leaf-axils, subsessile ; stamens included in the calyx-tube .. .. *scandens*

C. scandens *Engl. & Gilg*—F.T.A. 6, 1 : 248. *C. djalonensis* of Chev. Bot. 546, name only. Forest climber, twigs purplish-brown with conspicuous lenticels ; flowers greenish-yellow.
Fr.G.: Fouta Djalon (Oct.) *Chev.* 20183 ! **S.Nig.:** Enugu (Aug.) *Jones* FHI 762 ! Calabar *Thomson* 73 ! **Br.Cam.:** Buea, 3,900–5,000 ft. (May) *Maitland* 657 ! *Preuss* 878 ! Also in French Cameroons and Uganda.

6. **GNIDIA** Linn.—F.T.A. 6, 1 : 216.

Calyx glabrous in the upper part ; stems short and unbranched from an erect woody rhizome ; leaves oblanceolate, obtuse, up to 2·5 cm. long and 8 mm. broad 1. *macrorrhiza*
Calyx pubescent in the upper part ; stems elongated, branched ; leaves narrowly lanceolate, acute, about 1·2 cm. long.. .. .. 2. *schweinfurthii*

1. **G. macrorrhiza** *Gilg*—F.T.A. 6, 1 : 218. *G. mittuorum* Gilg—F.T.A. 6, 1 : 218 ; F.W.T.A., ed. 1, 1 : 151 ; Chev. Bot. 545. Perennial herb with woody stock and erect unbranched shoots 6–12 in. high, with glaucous leaves often tinged crimson ; flowers yellow to red-brown ; appearing in savannah after bush fires.
Fr.Sud.: Couroula (Apr.) *Chev.* 738. **N.Nig.:** S.E. Sokoto Prov. (Feb.) *Lely* 846 ! Zaria Prov. (Feb.) *Dalz.* 387 ! Anara F.R., Zaria (Mar.–May) *Keay* FHI 25782 ! Vom *Dent Young* 221 ! Widespread in tropical Africa.

2. **G. schweinfurthii** *Gilg*—F.T.A. 6, 1 : 219. Perennial herb with branched stems to 2 ft. high ; bracts red, flowers yellow.
N.Nig.: Zaria Prov. (Feb.) *Dalz.* 406 ! Vom (Jan.) *Dent Young* 222 ! Naraguta (Jan.) *Lely* 76 ! P. 127 ! Extends to A.-E. Sudan.

7. **ARTHROSOLEN** C. A. Mey.—F.T.A. 6, 1 : 234.

Involucral bracts ovate, acutely acuminate, shorter than the flowers ; leaves linear-acicular, with hard acute tips, 1·5–2 cm. long ; heads with numerous flowers ; calyx shortly pubescent .. .. 1. *chrysanthus*
Involucral bracts obovate, rounded at apex, as long as or longer than the flowers ; leaves linear, obtuse, up to 2·5 cm. long ; heads with few (about 12) flowers ; calyx more or less villous .. .. 2. *foliosus*

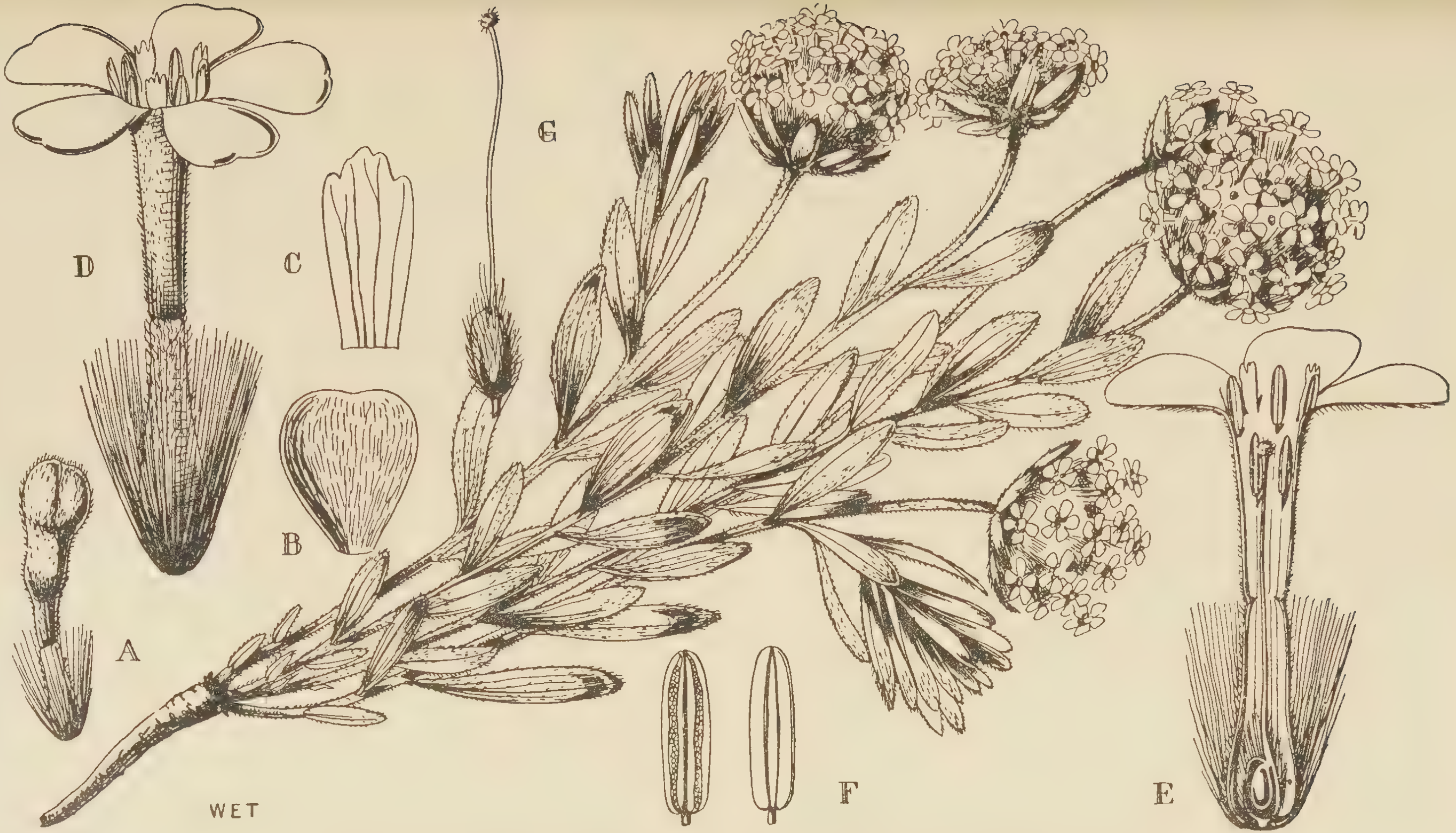

FIG. 65.—LASIOSIPHON KRAUSSIANUS (*Meisn.*) *Burtt-Davy* (THYMELAEACEAE).

A, flower-bud. B, calyx-lobe. C, petal. D, flower. E, flower in longitudinal section. F, anthers. G, ovary with style.

1. **A. chrysanthus** *Solms-Laub.*—F.T.A. 6, 1 : 234. Perennial herb with woody stock and erect, sparingly branched shoots, up to 18 in. high ; flowers bright yellow ; in savannah.
Fr.G.: Kèbeya (June) *Pobéguin* 716 ! **N.Nig.:** Kontagora (Nov.) *Dalz.* 106 ! Zaria (May) *Keay* FHI 25810 ! Katagum *Dalz.* 427 ! Lokoja *Baikie* ! Naraguta (Apr.) *Lely* 79 ! P. 249 ! Biu (May) *Noble* 52 ! Widespread in tropical Africa.

2. **A. foliosus** *H. H. W. Pearson* in F.T.A. 6, 1 : 237 (1910) ; Chev. Bot. 544. Flowering stems stout, woody, up to 3 ft. high ; a willow-like plant of rocky river banks ; flowers yellow ; flowering in dry season, submerged during rainy season.
Fr.Sud.: near Bamako (Jan.) *Chev.* 256 ! **S.L.:** R. Seli, Bumbuna *Dawe* 516 ! R. Seli, Makump (Jan.) *Glanville* 136 ! Batkanu (Jan.) *Deighton* 2848 ! **Iv.C.:** Mt. Momy, Gouro (Apr.) *Chev.* 21374 !

8. **LASIOSIPHON** Fres.—F.T.A. 6, 1 : 227.

A tree, up to 15 m. high, much-branched ; older branchlets marked by the scars of the fallen leaves ; leaves oblanceolate, very acute, 5–8 cm. long, the margin recurved at base, glabrous ; flower-heads subsessile, large, about 5 cm. in diam., surrounded by large ovate glabrescent to softly tomentellous bracts ; calyx-tube tomentose and with a dense tuft of long silky golden hairs at the base ; petals spathulate 1. *glaucus*

Stems dwarf, more or less simple and arising from woody rhizomes, glabrous or pubescent ; leaves lanceolate, obtuse or subacute, 3–4 cm. long, glabrous or pubescent ; flower-heads on long peduncles, about 3 cm. in diam., with lanceolate pubescent or glabrous bracts ; calyx-tube silky-pilose, with longer whitish hairs towards the base ; petals membranous, often emarginate or lobed .. .. 2. *kraussianus*

1. **L. glaucus** *Fres.*—F.T.A. 6, 1 : 230. Tree of montane open woodland ; flowers pale yellow, in numerous balls.
Br.Cam.: Cam. Mt., 5,000–7,500 ft. (Nov.–Jan.) *Mann* 1201 ! 2171 ! *Maitland* 292 ! 801 ! *Mildbr.* 10822 ! Above Bamenda (Dec.–Jan.) *Migeod* 337 ! *Tamajong* FHI 22215 ! Widespread on the mountains of central and E. Africa. (See Appendix, p. 42.)

2. **L. kraussianus** (*Meisn.*) *Burtt-Davy* Man. Fl. Pl. Transvaal 1 : 207 (1926). *Gnidia kraussiana* Meisn. (1843) ; Chev. Bot. 545. *L. kraussii* Meisn. (1857) ; F.T.A. 6, 1 : 231. *L. kerstingii* H. H. W. Pearson in F.T.A. 6, 1 : 233. *L. guineensis* of Chev. Bot. 545, name only. Perennial herb, with flowering shoots appearing after bush fires ; flowers yellow ; frequent in savannah woodland, especially in N. Nigeria.
Fr.Sud.: Tabacco (Jan.) *Chev.* 121. **Fr.G.:** Labé (Apr.) *Chev.* 12282 ! 12327 ! **G.C.:** Tumu, N.T. (Apr.) *Vigne* 3782 ! **Togo:** Kirikiri (Jan.) *Kersting* 36 ! **N.Nig.:** many localities, including : Sokoto *Ryan* 3 ! Katagum *Dalz.* 382 ! Zaria (Feb.–May) *Hill* 44 ! *Keay* FHI 25760 ! Nupe *Barter* 1668 ! Bauchi Plateau (Jan.–Mar.) *Hill* 32 ! *Lely* 11 ! 13 ! P. 23 ! Widespread in tropical and S. Africa. (See Appendix, p. 42.)

47. NYCTAGINACEAE

Herbs, shrubs or trees. Leaves alternate or opposite, simple ; stipules absent. Flowers actinomorphic, hermaphrodite or unisexual, usually cymose, sometimes surrounded by brightly coloured bracts, the latter occasionally simulating a calyx. Calyx tubular, often petaloid, valvate or folded in the bud. Petals absent. Stamens 1 to many, hypogynous, free or connate at the base, involute in bud ; anthers 2-celled, opening lengthwise. Ovary superior, 1-celled ; style slender ; ovule solitary, erect and inverted. Fruit indehiscent, enclosed in the persistent base of the calyx, often glandular. Seeds with copious or scanty endosperm and straight or curved embryo.

Mainly in tropical America, a few in the tropics and subtropics of the Old World. Recognized by the absence of stipules, regular apetalous flowers with tubular perianth, superior 1-celled ovary and indehiscent often glandular fruit.

Bracts small and free, not resembling a calyx :
  A spiny shrub ; flowers polygamo-dioecious ; fruits on long pedicels, clothed with rows of numerous sticky gland-tipped tubercles .. .. .. 1. **Pisonia**
  Not spiny ; herbaceous ; flowers hermaphrodite :
    Perennial plants with climbing or scrambling stems ; flowers in umbels or verticels ; fruits clavate, obscurely ribbed, with large, scattered mucilaginous glands 2. **Commicarpus**
    Annual or perennial diffuse herbs, flowers in capitula or lax cymes ; fruits narrowly obovoid with 3–5 prominent ribs, smooth or minutely and densely glandular 3. **Boerhavia**
Bracts connate and forming a calyx-like involucre ; flowers hermaphrodite ; fruits not glandular.. .. .. 4. **Mirabilis**

Besides the above, species of ***Bougainvillaea*** Comm. ex Juss., from S. America, are cultivated in our area.

1. **PISONIA** Linn.—F.T.A. 6, 1 : 8.

Climbing shrub, armed with stout sharp axillary curved spines ; leaves broadly elliptic-subacute at the base, obtuse at the apex, 6–9 cm. long, 3–5 cm. broad, finely tomentellous beneath when young, at length glabrous ; flowers unisexual, cymose ; calyx tomentellous ; stamens exserted ; fruits on long pedicels, clothed with rows of numerous hard sticky gland-tipped tubercles, tomentellous between the rows *aculeata*

P. aculeata *Linn.*—F.T.A. 6, 1 : 8. Scandent shrub, to 30 ft. high ; flowers cream. Local, and possibly introduced.

G.C.: Akropong (Oct.) *Johnson* 806 ! Swedru (Sept.) *Dalz.* 101 ! Bobiri F.R. (fr. Jan.) *Andoh* FH 5456 ! **S.Nig.**: Ilaro to Ajilite *Millen* 162 ! Ibadan North F.R. (Nov.) *Chizea* FHI 23961 ! Widespread in the tropics.

2. **COMMICARPUS** Standl. in Contrib. U.S. Nat. Herb. 12 : 373 (1909).

By R. D. Meikle

Flowers minute (scarcely 5 mm. long, including ovary), pink ; inflorescences verticillate, axillary ; fruits 5–8 mm. long .. .. 1. *verticillatus*

Flowers larger (10–15 mm. long, including ovary), white ; inflorescences irregularly branched, verticillate or umbellate ; fruits about 10 mm. long .. 2. *plumbagineus*

1. **C. verticillatus** (*Poir.*) *Standl.* in Contrib. U.S. Nat. Herb. 18 : 101 (1916). *Boerhavia verticillata* Poir. in Dict. Sc. Nat. 5 : 56 (1804) ; F.T.A. 6, 1 : 6 ; Chev. Bot. 526 ; F.W.T.A., ed. 1, 1 : 153. Stems scandent, glabrous.

Sen.: Sor Isl. (Aug.) *Roger* 81 ! *Leprieur* ! **Fr.Sud.**: Timbuktu (July) *Hagerup* 233 ! Generally distributed in tropical Africa ; also in Egypt, Arabia, India, Pakistan and Atlantic Islands.

2. **C. plumbagineus** (*Cav.*) *Standl.* l.c. 18 : 101 (1916). *Boerhavia plumbaginea* Cav. Icon. Pl. 2 : 7, t. 112 (1793) ; F.T.A. 6, 1 : 6, partly ; Chev. Bot. 526 ; F.W.T.A., ed. 1, 1 : 153. Stems tall, climbing or sprawling.

Sen.: Cayor (Feb.) *Döllinger* 44 ! M'bidjem (Aug.) *Thierry* 71 ! *Leprieur* ! **N.Nig.**: Katagum (Oct.) *Dalz.* 196 ! Throughout tropical Africa and S. Africa ; also in Spain, N. Africa and Orient. (See Appendix, p. 43.)

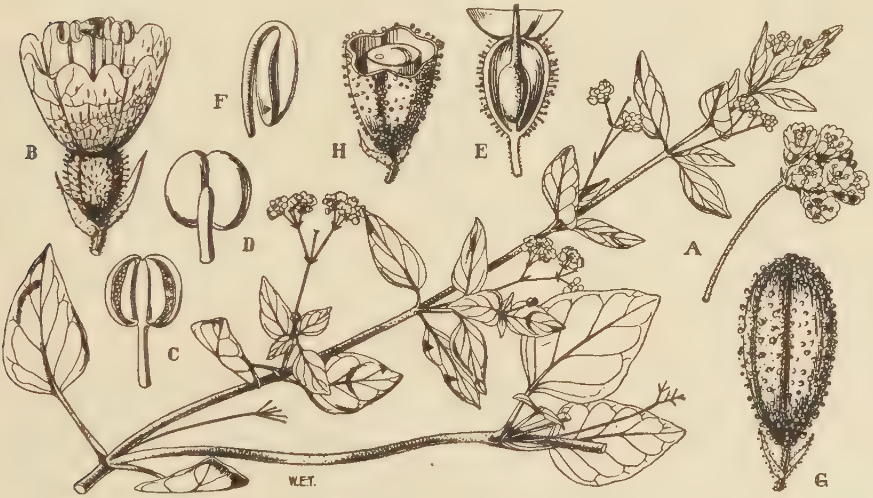

Fig. 66.—Boerhavia coccinea *Mill.* var. α (Nyctaginaceae).

A, flower-cluster. B, single flower. C, anther. D, anther from behind. E, calyx in vertical section. F, embryo. G, fruit. H, fruit in transverse section.

3. **BOERHAVIA** Linn. Sp. Pl. 3 (1753) ; Sprague in Kew Bull. 1928 : 348.

By R. D. Meikle

Fruits eglandular, not glutinous ; inflorescences erect and much-branched, leafless 1. *erecta*

Fruits glandular and more or less glutinous, inflorescences diffuse, cymose or axillary :

Stems prostrate or procumbent ; leaves small, usually less than 2·5 cm. long ; flowers minute, less than 1 mm. diam., pink or white, in short-stalked axillary clusters 2. *repens*

Stems erect or ascending ; leaves usually more than 2·5 cm. long ; flowers more than 1 mm. diam. ; ultimately forming lax, much-branched cymes :

Capitula 2–4-flowered ; inflorescence diffuse, much-branched, leafless ; flowers rich magenta or crimson ; stems usually glabrous ; young leaves fringed with long, brown, septate hairs .. .. 3. *diffusa*

Capitula 4–12-flowered ; inflorescence irregularly branched, often leafy ; flowers pink or mauve ; stems pubescent or hirsute, usually more or less viscid above :

Stems thinly pubescent or puberulous, leaves ultimately glabrous or subglabrous 4. *coccinea* var. α

Stems and leaves hirsute or densely pubescent, viscid 4a. *coccinea* var. *viscosa*

1. **B. erecta** *Linn.* Sp. Pl. 3 (1753) ; Heimerl in E. & P. Pflanzenfam. 16C : 118 (1934).
   G.C.: Paliba, N.T. (Dec.) *Adams & Akpabla* 4102 ! A widespread weed in the tropics of the Old and New Worlds.
2. **B. repens** *Linn.* l.c. 3 (1753) ; F.T.A. 6, 1 : 4, excl. vars. ; Chev. Bot. 526.
   Sen.: Bakel (July) *Leprieur* ! **Fr.Sud.:** Timbuktu (June) *Hagerup* 122 (partly) ! **N.Nig.:** Katagum (Oct.) *Dalz.* 148 ! R. Benue *Talbot* 48*a* ! Mamu (May) *Lely* 167 ! Bauchi Plateau (July) *Lely* P. 356 ! Widespread in the drier parts of the tropics.
3. **B. diffusa** *Linn.* l.c. 3 (1753) ; F.W.T.A., ed. 1, 1 : 153, partly. *B. repens* Linn. var. *diffusa* (Linn.) Hook. f. —F.T.A. 6, 1 : 5, partly. *B. adscendens* Willd. Sp. Pl. 1 : 19 ; F.T.A. 6, 1 : 4.
   Sen.: M'bidjem (Aug.) *Leprieur* 71 ! **S.L.:** Freetown (Dec.) *Deighton* 527 ! **Lib.:** Gbanga (Sept.) *Linder* 380 ! Sinkor (July) *Barker* 1379 ! **G.C.:** Aburi (Nov.) *Johnson* 1103 ! Axim (Mar.) *Chipp* 413 ! **Togo:** near Lome *Warnecke* 367 ! Kpeve (Mar.) *Williams* 47 ! **N.Nig.:** Stirling Hill *Ansell* ! *T. Vogel* ! Nupe *Barter* 660 ! Sokoto (Nov.) *Moiser* 23 ! 92 ! Matyoro (Oct.) *Thornewill* 140 ! **S.Nig.:** Nun R. (Sept.) *Mann* 478 ! Lagos *Millen* 27 ! Awka *Thomas 7 bis* ! Agulu *Thomas* 309 ! A common pantropical weed. (See Appendix, p. 43.)
4. **B. coccinea** *Mill.* Gard. Dict. No. 4 (1768) var. α. *B. diffusa* of F.W.T.A., ed. 1, 1 : 153, partly, not of Linn. *B. repens* var. *diffusa* (Linn.) Hook. f.—F.T.A. 6, 1 : 5, partly. The W. African specimens differ from typical *coccinea* in the close pubescence of the stems and the pink (not crimson) flowers.
   Sen.: *Farmer* 128 ! Richard Tol (Jan.) *Döllinger* 24 ! **Gam.:** *Pirie* 53 ! *Saunders* 126 ! **Fr.Sud.:** Kouroussa (Feb.) *Chev.* 393 ! **S.L.:** Scarcies (Jan.) *Sc. Elliot* 4721 ! Freetown (Oct.) *Deighton* 2145 ! Batkanu (Jan.) *Deighton* 2859 ! **Lib.:** Monrovia (Dec.) *Dinklage* 3300 ! **G.C.:** *Williams* 515 ! Half Assinie (July) *Chipp* 272 ! **N.Nig.:** *T. Vogel* ! Nupe *Barter* 862 ! Katagum (Aug.) *Dalz.* 147 ! Sokoto (Nov.) *Lely* 136 ! Baradau (May) *Lely* 86 ! Kontagora (Jan.) *Meikle* 1077 ! Gidan Mudi, Zaria (July) *Keay* FHI 25939 ! **S.Nig.:** Abeokuta *Irving* 136 ! Oshogbo (Apr.) *Moloney* 79 ! Lagos Colony *Punch* 61 ! 62 ! Ibadan (Dec.) *Meikle* 918 ! *Keay* FHI 25694 ! A common pantropical weed.

4a. **B. coccinea** *Mill.* var. **viscosa** (*Lag. & Rodr.*) *R. M. Mosc.* in Cat. Fl. Doming. 1 : 180 (1943). *B. viscosa* Lag. & Rodr. in An. Cienc. Nat. 4 : 256 (1801) ; F.W.T.A., ed. 1, 1 : 153. *B. repens* Linn. var. *viscosa* Choisy—F.T.A. 6, 1 : 5.
   Fr.Sud.: Timbuktu (July) *Hagerup* 176 ! Amango (Sept.) *Hagerup* 395 ! **N.Nig.:** Sokoto (Aug.) *Dalz.* 386 ! Fodama (Dec.) *Moiser* 202 ! Also in E. Africa, Arabia and tropical America.

4. MIRABILIS Linn.—F.T.A. 6, 1 : 1.

Erect herb ; leaves ovate-triangular, acutely acuminate, more or less truncate at the base, up to 10 cm. long and 6 cm. broad, conspicuously marked with cystoliths ; petiole rather long and slender ; flowers cymose, few ; bracts calyx-like, connate in the lower part, puberulous ; calyx petaloid, long-tubular with an expanded 5-lobed limb, tube 4 cm. long, glabrescent ; fruit about as long as the involucre, black when dry, ribbed, glabrous .. .. *jalapa*

M. jalapa *Linn.*—F.T.A. 6, 1 : 2. Flowers purple, magenta, yellow or white, opening in late afternoon ; widely cultivated as an ornamental, now established in many parts.
S.L.: *Thomas* 9662 ! **G.C.:** *Cummins* ! **S.Nig.:** Lagos *Punch* 19 ! Ibadan (Sept.) *Latilo* FHI 13516 ! A native of Peru. (See Appendix, p. 43.)

48. PROTEACEAE

Trees or shrubs. Leaves alternate, rarely opposite, simple or much divided ; stipules absent. Flowers (in our species) in a bracteate capitulum or elongated spike. Calyx petaloid, tetramerous, valvate, tubular in bud, one segment soon splitting away from the others and releasing the style, three segments remaining united. Stamens 4 ; anthers opposite the calyx-lobes, subsessile, 2-celled, opening lengthwise. Hypogynous scales often present. Ovary superior, 1-celled ; style long, simple ; ovule 1 (in our species), subpendulous. Fruit a nut, densely bearded, crowned by the persistent style. Seed without endosperm.

Mainly confined to South Africa and Australia. A distinct family with the flowers in our species in large bracteate heads or elongated spikes.

Flowers in an elongated spike without an involucre .. .. 1. **Faurea**
Flowers in a head surrounded by numerous bracts .. .. 2. **Protea**

1. FAUREA Harv.—F.T.A. 6, 1 : 207.

Tree, with catkin-like spikes of flowers ; leaves broadly lanceolate, acute at each end, 12–18 cm. long, 3–8 cm. broad, with numerous lateral nerves prominent on both surfaces, branched or looped near the margin, sparingly pubescent, shining on the upper surface ; petiole 5–10 mm. long ; flowers about 15 mm. long, curved before opening ; calyx petaloid, softly pubescent .. .. *speciosa*

F. speciosa *Welw.*—F.T.A. 6, 1 : 211 ; Engl. Pflanzenw. Afr. 3, 1 : 65 ; Hauman in Fl. Congo Belge 1 : 232 ; Aubrév. Fl. For. Soud.-Guin. 68. *F. saligna* of F.T.A. 6, 1 : 209, partly (*Dalz.* 393), of F.W.T.A., ed. 1, 1 : 153, and of Chev. Fl. Viv. 1 : 353, not of Harv. Savannah tree, to 30 ft. high ; flower spikes reddish ; rare.
Togo: Sokode-Basari, *fide* Engl. *l.c.* **Dah.:** Kouandé *Chev.* **N.Nig.:** Zaria (Feb.) *Dalz.* 393 ! Anara F.R., Zaria *Keay* FHI 5495 ! Naraguta *Lely* 730 ! Bauchi (Jan.) *Lely* P. 15 ! Widespread in tropical Africa. (See Appendix, p. 44.)

2. PROTEA R.Br.—F.T.A. 6, 1 : 194.

Branchlets and leaves densely pilose or tomentose, especially when young ; inner bracts appressed silky-pilose outside ; perianth tube and limb pilose :
  Leaves elliptic, oblong-elliptic to elliptic-lanceolate, shortly cuneate at base, obtuse at apex, 12–23 cm. long, 5–12 cm. broad .. .. .. 1. *elliottii* var. *elliottii*
  Leaves lanceolate, gradually narrowed at each end, 10–15 cm. long, 2·5–5·5 cm. broad 1a. *elliottii* var. *angustifolia*
Branchlets and leaves glabrous, or very nearly so :
  Perianth and bracts (except for the ciliate margins) glabrous ; leaves elliptic-lanceolate to rhomboid, upper leaves sometimes lanceolate .. .. .. 2. *madiensis*
  Perianth long-pilose or shaggy ; bracts appressed silky-pilose outside :
    Perianth limb 1·5–2·5 cm. long, very shaggy-villous ; leaves elliptic to ovate-lanceolate, obtuse, 10–15 cm. long, 3–6 cm. broad .. .. .. 3. *angolensis*
    Perianth limb 1–1·3 cm. long, pilose, except for the glabrous middle lobe ; leaves lanceolate, subacute, 7–15 cm. long, 1·5–5 cm. broad .. .. 4. *argyrophaea*

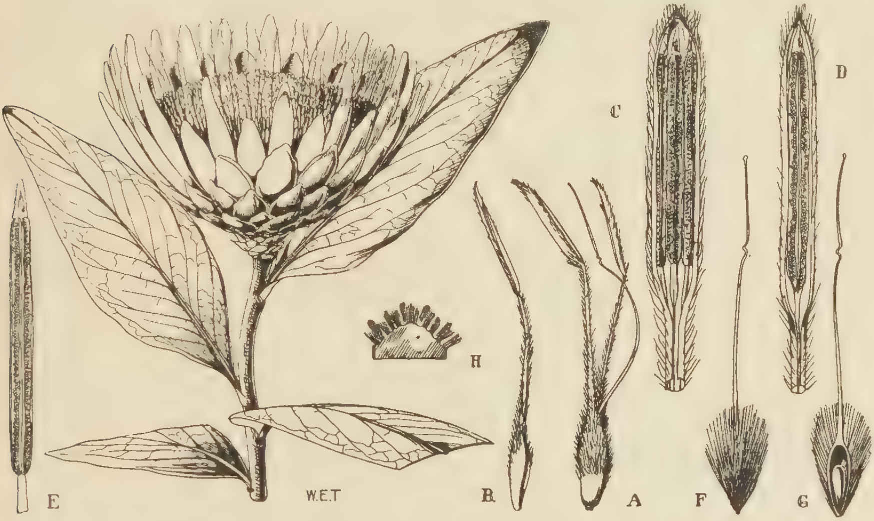

Fig. 67.—Protea elliotti *C. H. Wright* (Proteaceae).

A, flower showing calyx and style. B, upper lip of calyx, composed of 3 united segments. C, stamens on the calyx-limb (upper lip). D, stamen on calyx-limb (lower lip). E, stamen. F, ovary clothed with long hairs, and style. G, the same in longitudinal section. H, portion of receptacle with tufts of hairs.

1. **P. elliottii** *C. H. Wright* var. **elliottii**—F.T.A. 6, 1 : 205 ; Chev. Fl. Viv. 1 : 352. *P. bismarckii* Engl., name only. A shrub, up to about 10 ft. ; leaf-blades often disposed vertically ; flowers white, strongly odorous ; chiefly in lowland savannah.
Fr.G. & Iv.C.: *fide* Chev. *l.c.* **G.C.:** Bole, N.T. (Apr.) *McLeod* 847 ! Jemma, Ashanti (July) *Chipp* 528 ! Wenchi (Oct.) *Vigne* 2530 ! **Togo:** Sokode (Apr.) *Kersting* 82 ! Bo Gebirge *Kersting* A. 638 ! **Dah.:** *fide* Chev. *l.c.* **N.Nig.:** Zungeru (Sept.) *Elliott* 9 ! Kontagora (Jan.) *Dalz.* 69 ! **S.Nig.:** Eruwa *Foster* 117 ! Onitsha *Talbot* ! Enugu (Feb.) *Jones* FHI 712 Also in French Cameroons. (See Appendix, p. 44.)

1a. **P. elliottii** var. **angustifolia** *Keay* in Kew Bull. 1953 : 287. Shrub, 3 ft. high ; flowers white, with crimson bracts ; in mountain grassland.
Br.Cam.: above L. Oku, Bamenda, 7,500 ft. (Jan.) *Keay* FHI 28501 ! Also in French Cameroons.

2. **P. madiensis** *Oliv.*—F.T.A. 6, 1 : 204 ; Chev. Fl. Viv. 1 : 349. Shrub, or tree, to 10 ft. high ; flowers white, with the bracts rose-pink outside.
S.Nig.: Enugu (Sept.–Nov.) *Rosevear* 4/28 ! *Smith* 4 ! Mt. Koloishe, Obudu, 5,000 ft. (Dec.) *Keay & Savory* FHI 25077 ! Widespread in east, central and south tropical Africa.

3. **P. angolensis** *Welw.*—F.T.A. 6, 1 : 205 ; Chev. Fl. Viv. 1 : 350. Shrub, or tree, in savannah.
Fr.G. & Iv.C.: *fide* Chev. *l.c.* **G.C.:** Zau (Aug.) *Dalz.* 175 ! **Togo:** R. Daka, Bubadia (May) *Krause* ! **Dah.:** *fide* Chev. *l.c.* Widespread in east, central and south tropical Africa.

4. **P. argyrophaea** *Hutch.* in Kew Bull. 1922 : 398. Shrub, to 4 ft. high ; flowers white with silvery bracts.
N.Nig.: Bauchi Plateau, 3,000–5,000 ft. (June–Aug.) *Lely* 381 ! P. 394 ! P. 673 ! *Kennedy* FHI 7259 !

49. DILLENIACEAE [1]

Shrubs or undershrubs, often climbing, rarely trees or herbs ; leaves alternate, simple, entire or dentate (rarely divided) ; stipules very rare, and then adnate to the petiole and early deciduous. Inflorescence various. Flowers yellow or white, hermaphrodite or polygamous, rarely dioecious. Sepals 5, rarely fewer, imbricate, persistent. Petals 5 or fewer, imbricate, fugacious. Stamens hypogynous, numerous, rarely 10 or fewer, free or variously united at the base. Carpels 1 or many, generally free ; ovules 1 to many in each carpel. Fruits dehiscing by one or both sutures. Seeds 1 or few, with an aril ; endosperm copious, with minute embryo.

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[1] In the first edition this family was contributed by T. F. Chipp.

Tropics generally and in Australia. Recognized by the alternate strongly penninerved exstipulate simple leaves, persistent imbricate sepals, usually numerous stamens, divergent anther-cells, mostly free and few carpels, and arillate seeds.

Dillenia indica Linn., a native of tropical Asia, is cultivated in Sierra Leone, Gold Coast and Nigeria ; " fruit " composed of fleshy sepals.

TETRACERA Linn.—F.T.A. 1 : 12.

Climbing shrubs, rarely trees. Leaves simple, entire or denticulate. Panicles terminal, spreading, rarely few-flowered. Flowers yellow, white, or calyx green. Sepals spreading. Filaments dilated above ; anthers 2-celled. Carpels 3–5 (rarely 1–2), acuminate, coriaceous when mature, shining ; ovules indefinite in two series. Seeds 1–5 ; aril laciniate, scarlet.

Outer surface of sepals glabrous or shortly pubescent :

Sepals densely sericeous within ; carpels pilose when young, sometimes sparsely so ; fruiting carpels striate ; flowers numerous, mostly clustered towards the tips of the branches of the lax panicles ; inner sepals 4–5 mm. long ; leaves oblong to elliptic, 4–11 cm. long, 2–5·5 cm. broad, dentate in the upper half, finely scabrid above .. .. 1. *potatoria*

Sepals not densely sericeous within, glabrous or nearly so :

Carpels densely sericeous when young, strigose when mature ; inner sepals about 10 mm. long and 7 mm. broad ; leaves obovate-oblong, 7–13 cm. long, 4–7 cm. broad, margin entire, smooth on both surfaces, finely pubescent on midrib and nerves beneath .. .. 2. *dinklagei*

Carpels glabrous when young, rarely sparsely pubescent :

Sepals 6–8 mm. long :

Leaves oblong to oblong-obovate, 6–16 cm. long, 3·5–9 cm. broad, margin entire or slightly undulate towards the apex, very shortly scabrid on both surfaces, sparsely pubescent on midrib and nerves beneath, or glabrescent 3. *alnifolia*

Leaves narrowly elliptic to oblong-lanceolate, gradually acute at each end, 8–12 cm. long, 2·5–4·5 cm. broad, margin entire, glabrous .. .. 4. *djalonica*

Sepals 4–4·5 mm. long :

Petiole winged, together with the midrib and nerves beneath covered with long stiff spreading hairs ; leaves obovate-oblong to oblong-lanceolate, 7–18 cm. long, 3·5–6·5 cm. broad, margin more or less entire ; sepals very sparsely pubescent outside .. .. 5. *podotricha*

Petiole not winged, together with the midrib and nerves beneath pilose ; leaves oblong-elliptic to obovate, 6–12 cm. long, 3–6 cm. broad, margin serrate in upper third ; lateral nerves markedly impressed above ; sepals rather densely pubescent outside ; fruiting carpels smooth .. .. .. 6. *leiocarpa*

Outer and inner surfaces of sepals densely sericeous, 5–6 mm. long ; carpels sericeous when young :

Petioles not winged, 1–2 cm. long ; lamina oblong-elliptic, 6–8 cm. long, 3–4·5 cm. broad, denticulate towards the apex, scabrid above and beneath, pubescent on midrib and nerves beneath .. .. 7. *affinis*

Petiole winged ; lamina oblong-elliptic to obovate, 6–12 cm. long, 3 -6 cm. broad, denticulate towards the apex, scabrid above, pilose beneath .. 8. *eriantha*

1. **T. potatoria** *Afzel. ex G. Don* Gen. Syst. 1 : 69 (1831) ; Gilg in Engl. Bot. Jahrb. 33 : 198 (1902) ; Chev. Fl. Viv. 1 : 64. *T. obtusata* Planch. ex Oliv. F.T.A. 1 : 12. *T. leiocarpa* Stapf in J. Linn. Soc. 33 : 81 (1905), partly (flowering spec.) ; F.W.T.A., ed. 1, 1 : 155, partly. *T. eriantha* (Oliv.) Hutch. in Kew Bull. 1923 : 81, partly (*Talbot* 1320). Scandent shrub or liane, to 30 ft. high ; flowers white, sweet scented.
Sen.: Bignona, Casamance (Feb.) *Chev.* 2540 ! *Etesse* 50 ! **Port G.**: Pussubé, Bissau (Mar.) *Esp. Santo* 1482 ! **Fr.G.**: Rio Nunez *Heudelot* 643 ! Conakry (Feb.) *Chev.* 12059 ! *Debeaux* 329 ! Macenta (Oct.) *Baldwin* 9758 ! Pita (Nov.) *Pobéguin* 2178 ! **S.L.**: *Afzelius* ! *Don* ! Freetown (Feb.) *Johnston* 2 ! Kenema (fr. Jan.) *Thomas* 7546 ! Njala (Nov.) *Deighton* 1510 ! Yonimamila (Dec.) *King* 15*b* ! **Lib.**: Kakatown *Whyte* (partly) ! Gongon (Nov.) *Bunting* 56 ! Vonjama (Oct.) *Baldwin* 9933 ! **Togo**: Lome *Warnecke* 448 ! Kpandu *Robertson* 75 ! **Dah.**: Dogba (Sept.) *Le Testu* 289 ! **S.Nig.**: Lagos *Millen* 94 ! Abeokuta *Irving* ! Agbede, Kukuruku (Nov.) *Keay* FHI 28080 ! Onitsha (fr. Feb.) *Jones* FHI 7432 ! Oban *Talbot* 1320 ! Also in Ubangi, Belgian Congo, Uganda and A.-E. Sudan. (See Appendix, p. 45.)
2. **T. dinklagei** *Gilg* in Engl. Bot. Jahrb. 33 : 201 (1902) ; Stapf in Johnston Lib. 574 ; Chev. Fl. Viv. 1 : 67. Large climber ; flowers large, white ; fruits brown.
Lib.: Grand Bassa (fl. Sept., fr. Oct.) *Dinklage* 1752 ; 1837 ! 2049 !
3. **T. alnifolia** *Willd.*—F.T.A. 1 : 12 ; Gilg l.c. 199 ; Chev. Fl. Viv. 1 : 65. *T. leiocarpa* of Chev. Fl. Viv. 1 : 64, partly, not of Stapf. *T. podotricha* of Chev. Fl. Viv. 1 : 65, partly, not of Gilg. Large liane, flowers white ; frequent on the sea coast, in mangrove swamps, and also inland.
Sen.: Fogny, Casamance (Feb.) *Chev.* 2541 ! **Gam.**: Albreda *Perrottet* ! Bathurst (Feb.) *Johnston* 90 ! **Fr.Sud.**: Fantiéla (Apr.) *Chev.* 743 ! **Port.G.**: Bijimata, Bissau (Feb.) *Esp. Santo* 1765 ! **Fr.G.**: *Maclaud*

23 ! Tristao Isl. *Paroisse* 67 ! Kouroussa (Nov.) *Pobéguin* 589 ! **S.L.:** *Afzelius* ! Near Freetown (fl. Aug. fr. Dec.) *Smythe* 53 ! *Lane-Poole* 34 ! Port Loko (fr. Dec.) *Thomas* 6527 ! Falaba (Mar.) *Sc. Elliot* 5136 ! Sulima (Feb.) *Deighton* 4597 ! **Lib.:** Kakatown *Whyte* ! Grand Bassa (Aug.) *Dinklage* 1704 ! Gbanga (fr. Sept.) *Linder* 485 ! Zorzor, Vonjama (Oct.) *Baldwin* 10023 ! **Iv.C.:** Tabou (Aug.) *Chev.* 20048 ! Bingerville (Jan.) *Jolly* 264 ! Baoulé (Oct.) *Pobéguin* 188 ! **G.C.:** Axim (Aug.) *Vigne* 4783 ! Lante Hills (Nov.) *Johnson* 809 ! **Togo:** *Büttner* 313 ! Alavanyo *St. C. Thompson* 3657 ! **Dah.:** Cotonou (fr. Mar.) *Debeaux* 349 ! Ouidah (fr. Apr.) *Chev.* 23441 ! [**N.Nig.:** Bauchi Plateau (Jan.) *Lely* P. 57 ! Ropp (Dec.) *W. D. MacGregor* 404 !—possibly a distinct species.] **S.Nig.:** Aboh *Ansell* ! Niger delta (fr. Aug.) *T. Vogel* 4 ! *Barter* 2099 ! *Mann* 463 ! Bonny (Feb.) *Kalbreyer* ! Calabar (fr. Mar.) *Brenan* 9218 ! **Br.Cam.:** near Debundscha (Jan.) *Keay* FHI 28659 ! **F.Po:** *Mann* ! Ureka (Feb.) *Guinea* 2442 ! Also in French Cameroons, Ubangi, Gabon, Principe and Angola. (See Appendix, p. 44.)

4. **T. djalonica** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 156 (1927) ; Chev. Bot. 4, name only.
Fr.G.: between Mamou and Dalaba (fr. Dec.) *Chev.* 20247 !

5. **T. podotricha** *Gilg* l.c. 200 (1902). [Of the specimens from our area cited as this species by Chev. Fl. Viv. 1 : 67, one is *T. potatoria* Afzel. ex G. Don, one is *T. alnifolia* Willd. and the others are sterile and cannot be named certainly.] Forest liane, with distinctive long hairs on petiole.
S.Nig.: Lagos *Moloney* ! Onitsha *Inyang* FHI 15457 ! Eket *Talbot* ! Calabar *McLeod* ! Oban *Talbot* ! **Br.Cam.:** *Kalbreyer* 46 ! Also in French Cameroons, Congo and Angola.

6. **T. leiocarpa** *Stapf* in J. Linn. Soc. 33 : 81 (1904), partly (fruiting spec.).[1] *T. guineensis* A. Chev. Fl. Viv. 1 : 71, t. 13 (1938), French descr. only. Scandent shrub, to 25 ft. high, with smooth shining fruits.
Fr.G.: Mamou to Dalaba (Dec.) *Chev.* 20248 ! Dalaba-Diaguissa (Oct.) *Chev.* 18705 ! Kouria (Nov.) *Chev.* 14873 ! Teliko (Oct.) *Pobéguin* 1442 ! **Lib.:** Kakatown *Whyte* (partly) ! Dukwia R., Monrovia (fr. Oct., Nov.) *Cooper* 45 ! **Iv.C.:** Mt. Gbon, Dyolas (fr. May) *Fleury* in *Hb. Chev.* 21408 !

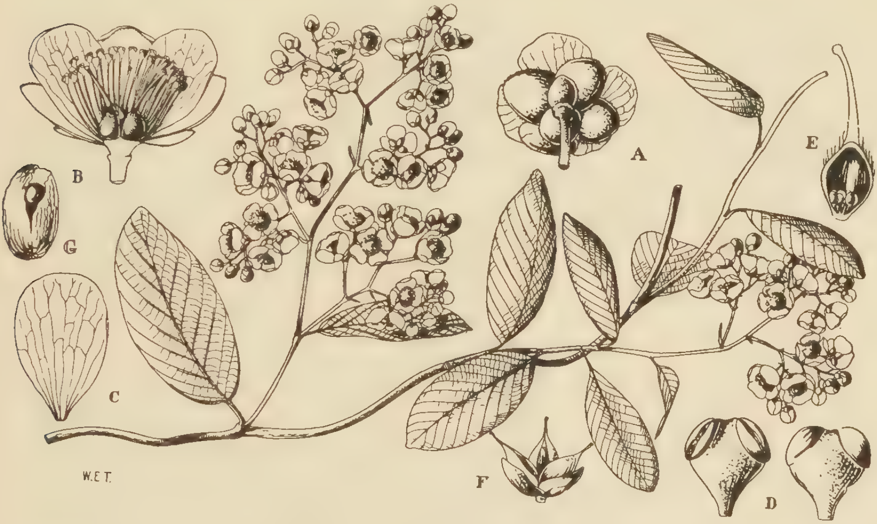

FIG. 68.—TETRACERA ALNIFOLIA *Willd.* (DILLENIACEAE).

A, flower from below. B, flower in vertical section. C, petal. D, stamens, front and back. E, vertical section of carpel. F, carpels. G, seed with aril.

7. **T. affinis** *Hutch.* in Kew Bull. 1923 : 180 ; Chev. Fl. Viv. 1 : 69. Scrambling shrub, to 40 ft. high ; flowers white.
Iv.C.: Dabou (Sept.) *Chev.* 17253 ! Bériby to Tabou (Aug.) *Chev.* 20039 ! Ono (Nov.) *Hedin* ! **G.C.:** Akwapim Hills (Oct.) *Johnson* 796 ! Abetifi, Kwahu (Nov.) *Irvine* 1722 !

8. **T. eriantha** (*Oliv.*) *Hutch.* l.c. 181 (1923) ; Chev. Fl. Viv. 1 : 69. *T. obtusata* Planch. var. *eriantha* Oliv. F.T.A. 1 : 12 (1868). Scandent shrub or liane, to 30 ft. high ; flowers white.
S.Nig.: Onitsha (Nov.) *Onochie* FHI 21642 ! Oban *Talbot* 1320 ! Bendiga Afi, Ikom (Dec.) *Keay* FHI 28273 ! **F.Po:** (Dec.) *Mann* 79 !

Imperfectly known species.

T. calothyrsa *Gilg & Lederm. ex Engl.* Pflanzenw. Afr. 3, 2 : 477 (1921).
Br.Cam.: Bali, Bamenda—no specimens cited.

50. PITTOSPORACEAE

Trees or shrubs. Leaves alternate, simple ; stipules absent. Flowers actinomorphic, hermaphrodite. Sepals 5, imbricate, free or nearly so. Petals 5, longer than the sepals, imbricate, free or united at the base. Stamens 5, hypogynous, free, alternate with the petals ; anthers 2-celled, opening lengthwise. Ovary 1-celled with parietal placentas or 2–5-celled and the placentas meeting in the middle, superior, sessile or shortly stipitate ; style simple, terminal ; ovules numerous. Fruit a loculicidal capsule with the placentas in the middle of the valves, or indehiscent. Seeds with hard endosperm and minute embryo.

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[1] *T. leiocarpa* Stapf is based on two sheets collected by *Whyte* neither of which is numbered or cited as the holotype. As however Stapf's diagnosis is based only on fruits, I have no hesitation in choosing the fruiting specimen as the lectotype. The flowering specimen is *T. potatoria* Afzel. ex G. Don.—R.W.J.K.

Mostly an Australian family. Recognized by the woody habit, definite stamens, usually parietal placentas, mostly 2-valved capsule, and seeds with copious endosperm and minute embryo.

PITTOSPORUM Banks ex Soland.—F.T.A. 1 : 124.

By G. Cufodontis

Shrubs or small trees ; leaves often undulate on the margin. Sepals free or slightly connate. Petals sometimes coherent at the base. Ovary usually imperfectly 2–5-celled. Capsule mostly 2-valved with the placentas in the middle of the valves. Seeds smooth, scarlet or black, mostly covered by sticky resin.

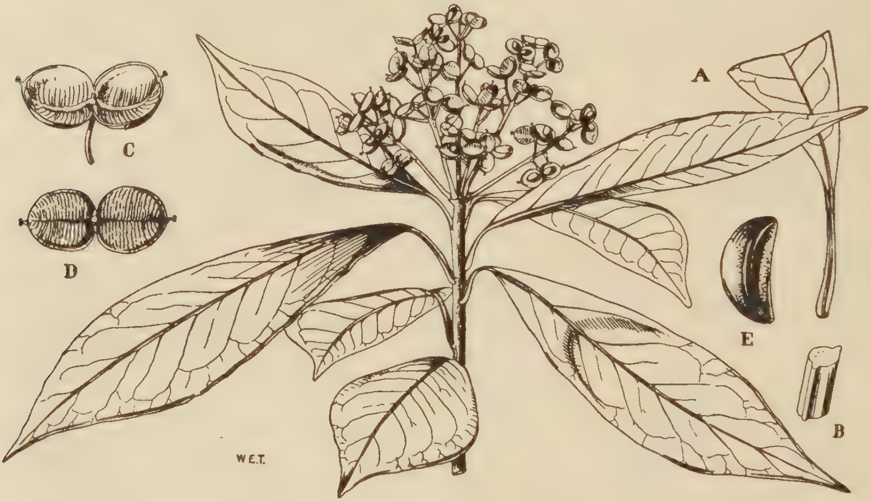

Fig. 69.—Pittosporum viridiflorum subsp. dalzielii (*Hutch.*) *Cuf.* (Pittosporaceae).

A, portion of leaf. B, section of a petiole. C, capsule, showing inner face of the valves. D, capsule, outer face. E, seed.

Petals about 4 mm. long ; sepals scarcely 1·5 mm. long, rather expanded and connate at base ; flower-buds club-shaped ; valves of ripe fruits thin, concave in transverse section, reflexed ; seeds usually 4, basifixed ; leaves always quite glabrous 1. *mannii*

Petals at least 5 mm., mostly 6–7 mm. long ; sepals at least 2 mm. long ; flower-buds egg-shaped ; valves of ripe fruits flat or slightly gibbous along the middle, horizontally spreading ; seeds mostly more than 4, superposed ; leaves sometimes hairy *viridiflorum*

Leaves, at least when young, more or less crisped-hairy beneath ; sepals always free from each other .. .. 2. *viridiflorum* subsp. *feddeanum*

Leaves quite glabrous or rarely slightly appressed pubescent along the midrib when young ; sepals sometimes connivent at base 3. *viridiflorum* subsp. *dalzielii*

1. **P. mannii** *Hook. f.*—F.T.A. 1 : 124 ; Cuf. in Fedde Rep. 55 : 81 (1952). A tree or large shrub, up to 30 ft. high ; corolla yellowish-white ; seeds scarlet.
Br.Cam.: Cam. Mt., 4,000–8,000 ft. (fl. & fr. Dec.–Apr.) *Mann* 1202 ! 2186 ! *Maitland* 656 ! *Preuss* 827 ! *Brenan* 9398 ! Bamenda Prov., 3,000–7,000 ft. (fl. Apr., fr. June–Oct.) *Johnstone* 19 ! 315 ! *Maitland* 1381 ! 1597 ! **F.Po**: Clarence Peak, 8,500 ft. (Dec., Apr.) *Mann* 386 ! 640 ! Also in French Cameroons.

2. **P. viridiflorum** *Sims* subsp. **feddeanum** (*Pax*) *Cuf.* l.c. 66 (1952). *P. feddeanum* Pax in Engl. Bot. Jahrb. 39 : 622 (1907). Shrub or small tree, up to 20 ft. high ; corolla whitish ; seeds tan to scarlet.
N.Nig.: Niell's Valley, Jos (fr. Nov.) *Keay & Onochie* FHI 21744 ! [Further material of this plant, so far known only in fruit, is required to confirm its identity ; the subspecies is otherwise known only in Abyssinia.]

3. **P. viridiflorum** *Sims* subsp. **dalzielii** (*Hutch.*) *Cuf.* l.c. 65 (1952). *P. dalzielii* Hutch. F.W.T.A., ed. 1, 1 : 157 (1927) ; Kew Bull. 1928 : 30 ; Chev. Fl. Viv. 1 : 345 ; Chev. in Bull. Soc. Bot. Fr. 93 ; 206 (1946). *P. mannii* of Chev. Fl. Viv. 1 : 347, partly. Shrub or small tree ; corolla whitish-yellow ; seeds scarlet.
Fr.G.: Fouta Djalon, 4,200 ft. (fr. Nov.) *Chev.* 34466 ! **Iv.C.**: Orodougou, Sassandra Valley (June) *Chev.* 21815 ! 21836 ! Bondoukou (fr. Aug.) *Aubrév.* 1604 ! **N.Nig.**: R. Koriga (fr. Feb.) *Dalz.* 417 ! Kachia to Kaduna (fr. Feb.) *Meikle* 1207 ! Bauchi Plateau (Jan.) *Lely* P. 48 ! **S.Nig.**: Obudu, 3,000 ft. (fl. & fr. Dec.) *Keay & Savory* FHI 25042 ! 25129 ! Also in French Cameroons, Ubangi-Shari and perhaps in Abyssinia.

In addition to the above, *P. undulatum* Andr. is cultivated in Sierra Leone.

51. BIXACEAE

Shrubs or small trees with coloured juice. Leaves alternate, simple, palminerved, stipulate. Flowers hermaphrodite, medium-sized, showy, paniculate. Sepals 5, imbricate, deciduous, with a large fleshy gland at the base outside. Petals 5, large, imbricate, without a scale at the base. Disk none. Stamens numerous, hypogynous ; filaments free ; anthers horse-shoe-shaped, opening by short slits at the top. Ovary superior, 1-celled, with 2 parietal placentas ; ovules numerous ; style slender, recurved in bud ; stigma 2-lobed. Fruit a densely echinate-setose or smooth capsule, 2-valved ; valves thick, with the placentas in the middle. Seeds obovoid ; testa rather fleshy, red ; endosperm copious ; embryo large ; cotyledons broad, incurved at the apex.

A family now restricted to the single genus *Bixa*, with numerous stamens and horse-shoe-shaped anthers, parietal placentas, and 2-valved capsule.

BIXA Linn.—F.T.A. 1 : 113.

Characters of the family.

Branches and rhachis of the inflorescence covered with small rusty scales ; leaves slightly cordate at the base, acutely acuminate, entire, up to 20 cm. long and about 12 cm. broad ; flowers about 2·5 cm. long, pinkish-white, in terminal panicles ; fruit narrowly ovoid, pointed, about 4 cm. long, densely covered with stiff slender bristles; opening into 2 divergent valves ; seeds covered with a red pulp.. .. *orellana*

B. orellana *Linn.*—F.T.A. 1 : 114 ; Chev. Bot. 36. An introduced shrub ; sometimes subspontaneous. **Fr.G.:** Farana (Jan.) *Chev.* 20551 ! **S.L.:** *Barter* ! Samu Country *Sc. Elliot* 4328 ! Njala (fr. Dec.) *Deighton* 1859 ! **Lib.:** Buchanan, Grand Bassa (fr. Mar.) *Baldwin* 11203 ! **G.C.:** Obuasi (fr. Jan.) *Soward* 652 ! Jema, Ashanti (Jan.) *Brown* FH 2161 ! **S.Nig.:** Sapoba *Kennedy* 1742 ! Onitsha *Barter* 1309 ! Awka *Thomas* ! **F.Po:** *Mann* 267 ! Widely cultivated in the tropics ; a native of tropical America. (See Appendix, p. 45.)

52. COCHLOSPERMACEAE

Trees, shrubs, or rhizomatous subshrubs, with coloured juice. Leaves alternate, palmatilobed, stipulate. Flowers hermaphrodite, showy, paniculate or racemose. Sepals 5, imbricate, deciduous. Petals 5, imbricate or subcontorted, alternate with the sepals. Stamens numerous, the filaments free, equal or some longer than the others ; anthers 2-celled, linear, opening by terminal short often confluent pore-like slits. Ovary 1-celled, with parietal placentas projecting into the cell, or perfectly 3-celled ; ovules numerous ; style simple, with minutely denticulate stigma. Fruit a 3–5-valved capsule. Seeds glabrous or covered with woolly hairs, straight or cochleate-reniform ; endosperm copious ; embryo conforming to the shape of the seed, large ; cotyledons broad.

A small family of two genera formerly included under *Bixaceae*. Note the anthers opening by pores and the usually hairy seeds on parietal placentas.

COCHLOSPERMUM Kunth—F.T.A. 1 : 112.

Low shrubs. Leaves palmately lobed, variable. Sepals 5, unequal. Petals 5, large, imbricate. Stamens numerous, with linear anthers on slender equal filaments. Ovary with 3–5 parietal placentas ; style slender. Fruit an obovoid often hairy capsule ; endocarp rather membranous. Seeds covered with long cottony hairs.

Long cottony hairs closely adhering to the seed ; flowers usually borne near the ground while plant is leafless, and sometimes also near apex of leafy shoots ; leafy shoots seldom exceeding 75 cm. high ; leaves usually deeply lobed with acute lobes, sometimes with lobes narrowly lanceolate, lobes usually serrate ; lower surface of mature leaves glabrescent or pubescent .. .. 1. *tinctorium*

Long cottony hairs loosely attached to membranous outer testa which is easily separable from the hard shining inner testa ; flowers usually borne at the apex of leafy shoots 1–2·5 m. high ; leaves seldom deeply lobed, lobes rounded, usually broadly oblong, seldom markedly serrate ; lower surface of mature leaves more or less densely woolly 2. *planchoni*

Intermediate forms, which may well be hybrids, are found in places where the two species grow together.

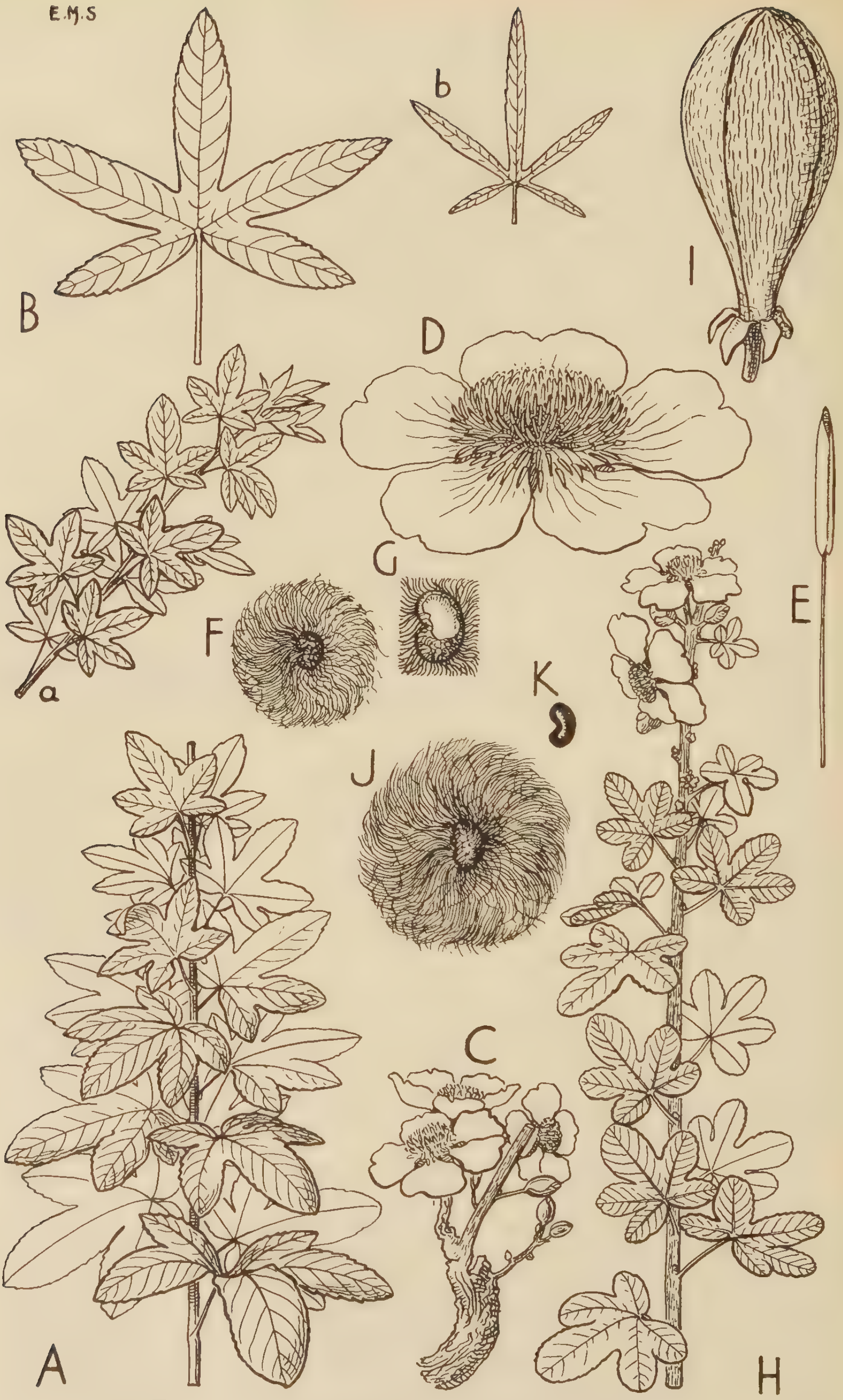

FIG. 70.—COCHLOSPERMUM SPP. (COCHLOSPERMACEAE).

C. tinctorium A. Rich.—A & a, leafy shoots, × ¼. B & b, leaves, × ⅔. C, inflorescence, × ¼. D, flower, × ⅔. E, stamen, × 4. F, seed, × 1. P, seed with portion of adhering outer testa removed, × 2.

A & a are drawn from *Keay* FHI 25763 ; B from *Thornewill* 28 ; b from *Vigne* 4666 ; C, D & E from *Brooks* 1 ; F & G from *Hill* 50.

C. planchoni Hook. f.—H, leafy flowering shoot, × ¼. I, fruit, × ⅔. J, seed × 1. K, seed removed from loose outer testa and floss.

H is drawn from *Lely* 672 ; I from *Mutch* FHI 27971 ; J & K from *Phillips* 67.

1. **C. tinctorium** *A. Rich.* in Guill. & Perr. Fl. Seneg. 99, t. 21 (1831) ; F.T.A. 1 : 113, partly (excl. syn. *C. planchoni* Hook. f.) ; Mildbr. in Engl. Bot. Jahrb. 58 : 236 (1923) ; Pilger in E. & P. Pflanzenfam. 21 : 317, t. 141 (1925) ; F.W.T.A., ed. 1, 1 : 158, partly. *C. niloticum* Oliv. F.T.A. 1 : 113 (1868) ; Trans. Linn. Soc. 29 : 30 (1872) ; Mildbr. l.c. 237 ; F.W.T.A., ed. 1, 1 : 158. Suffrutex, flowers bright yellow, normally appearing near the ground after the annual bush-fires and before the leafy shoots appear.
Sen.: *Perrottet* 98 ! Between Niaral and N'Denout, N'Boro (Apr.) *Leprieur* ! **Gam.:** (July) *Ozanne* ! *Brooks* 1 ! *Dawe* 52 ! **Fr.Sud.:** Boulouli (Dec.) *Chev.* 94 ! Bamako (Apr.) *Hagerup* 37 ! **Fr.G.:** Timbo *Farmar* 276 ! Kouroussa (Mar.) *Pobéguin* 187 ! 286 ! **S.L.:** Moria, Scarcies (Feb.) *Sc. Elliot* 4793 ! **G.C.:** Basisan to Pudo (May) *Kitson* ! Kologu, Navrongo (Apr.) *Vigne* 3768 ! Kayoro (Oct.) *Vigne* 4666 ! **Togo:** Losso, N. Sokode (Feb.) *Kersting* 556. **Dah.:** Atacora Mts. *Chev.* 24026 ! **N.Nig.:** *Thornewill* 28 ! Maigana *Vigo* ! Zaria (May) *Keay* FHI 25753 ! 25763 ! Anara F.R. (Mar.) *Olorunfemi* FHI 24418 ! Also in French Cameroons, A.-E. Sudan and Uganda. (See Appendix, p. 45.)
2. **C. planchoni** *Hook. f.* in Fl. Nigrit. 268 (1849) ; Mildbr. l.c. 235 ; Pilger l.c. t. 140. *C. tinctorium* of F.T.A. 1: 113 and of F.W.T.A., ed. 1, 1 : 158, partly, not of A. Rich. Flowers bright yellow, normally appearing towards the end of the rainy season, near the apex of leafy shoots 3–8 ft. high.
Fr.Sud.: Bamako (Aug., Sept.) *Waterlot* 1287 ! 1370 ! **Fr.G.:** Kouroussa (Oct.) *Pobéguin* 560 ! Timbo (Aug.) *Maclaud* 261 ! **S.L.:** Musaia (fr. Feb.) *Deighton* 4231 ! Wallia, Scarcies (fr. Feb.) *Sc. Elliot* 4259 ! Buyabuya (fl. & fr. Feb.) *Sc. Elliot* 4132 ! Falaba (Sept., Oct.) *Deighton* 5166 ! *Small* 434 ! Warantamba (Oct.) *Small* 342 ! Tundembaea (Oct.) *Thomas* 2876 ! **Iv.C.:** *Scaetta* 3277 ! Toura (May) *Chev.* 21700 ! Baoulé (Oct.) *Pobéguin* 167 ! **G.C.:** Wanki, Ashanti (June) *Chipp* 484 ! Dukwesein, Ashanti (fl. & fr. Dec.) *Chipp* 616 ! Yeji (July) *Pomeroy* 1252 ! Tamale (Sept.) *Williams* 388 ! **Togo:** Lome *Warnecke* 474 ! Kpedsu (Jan.) *Howes* 1077 ! Kpeve (Mar.) *Williams* 90 ! Sokode (July) *Kersting* A. 165 ! **Dah.:** Sagou (Nov.) *Poisson* 25 ! **N.Nig.:** R. Niger (Sept.) *T. Vogel* 121 ! *Baikie* ! Nupe *Barter* 1691 ! Zungeru (Nov.) *Dalz.* 132 ! *Elliott* 170 ! Lokoja *Migeod* 89 ! Isanlu, Kabba (Nov.) *Keay* FHI 28098 ! Mokwa (Nov.) *Mutch* FHI 27971 ! Makurdi (Oct.) *Binga* FHI 8080 ! **S.Nig.:** Lagos Colony *Punch* 50 ! *Phillips* 67 ! *Dawodu* 202 ! Ilaro (Jan.) *Millen* 115 ! Ado *Rowland* ! Olokemeji (Oct., Nov.) *Foster* 137 ! *Onochie* FHI 8157 ! Also in French Cameroons. (See Appendix, p. 45.)

Besides the above, *C. gossypium* (Linn.) DC., a native of tropical Asia, is cultivated in several parts of our area.

53. FLACOURTIACEAE [1]

Trees or shrubs. Leaves simple, alternate ; stipules often soon falling off. Flowers hermaphrodite or unisexual, often dioecious or polygamous, variously arranged. Sepals sometimes not distinguishable from the petals, imbricate or open in bud. Petals sometimes not arranged regularly in relation to the sepals, large, small or absent, with or without an opposite scale inside the base, imbricate. Stamens numerous, rarely few, hypogynous, free ; anthers 2-celled, often short, opening lengthwise by slits. Ovary 1-celled, with one or more parietal placentas, or rarely the placentas meeting in the middle ; ovules 2 or more on each placenta ; styles or stigmas as many as the placentas. Fruit indehiscent, mostly a berry or drupe, very rarely a capsule, sometimes large. Seeds with fleshy endosperm and medium-sized embryo ; cotyledons often broad.

Mainly in the tropics and subtropics, and formerly included in the *Bixaceae*, but differing by their straight anthers opening lengthwise by slits, and by the frequently unisexual flowers.

Inflorescence not adnate to the midrib of the leaf :
Perianth spiral or without differentiation into sepals and petals :
Inner perianth with scales adnate to the inner surface :
Stamens numerous, with long sometimes pointed anthers ; style 1 1. **Dasylepis**
Stamens 5 ; styles 3 .. .. 2. **Scottellia**
Inner perianth without scales .. .. 3. **Camptostylus**
Perianth cyclic, differentiated into sepals and petals or the latter absent :
Petals present :
Shrubs or small trees, armed with stout straight or recurved spines ; petioles short 4. **Oncoba**
Unarmed trees and shrubs ; petioles often elongated :
Flowers large, in short axillary inflorescences ; stigma crenate or branched ; seeds small, numerous ; leaves scaly or thinly hairy .. .. 5. **Caloncoba**
Flowers small, in long axillary inflorescences ; stigma undivided or slightly lobed ; seeds few or often only 1 at maturity ; leaves not scaly .. 6. **Lindackeria**
Petals absent :
Sepals imbricate ; styles more or less spreading ; seeds glabrous :
Flowers dioecious in short racemes or glomerules ; fruit a berry ; stamens numerous .. .. 7. **Flacourtia**
Flowers hermaphrodite or polygamous in lax terminal panicles ; fruit a capsule ; stamens 5–6 .. .. 8. **Ophiobotrys**
Sepals scarcely imbricate ; styles erect or suberect ; seeds often villous ; stamens numerous ; dioecious .. .. 9. **Dovyalis**
Inflorescence adnate to the midrib of the leaf, the latter large and elongate-oblanceolate 10. **Phyllobotryum**

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[1] This family was prepared for the first edition in collaboration with T. F. Chipp.

1. DASYLEPIS Oliv.—F.T.A. 1 : 123.

Pedicels 6–10 mm. long ; flowers racemose, laxly arranged ; leaves elliptic, shortly cuneate at base, obtusely acuminate, 12–20 cm. long, 6–9 cm. broad, distantly serrate, closely reticulate .. .. 1. *racemosa*

Pedicels up to 3 mm. long, or flowers subsessile ; flowers crowded, more or less spicate, or racemose with short pedicels :

Ovary and fruit densely long-pilose ; pedicels up to 3 mm. long ; leaves elongate-elliptic to elliptic-lanceolate, cuneate at base, long-acuminate, 12–25 cm. long, 4·5–6·5 cm. broad, distantly serrate, closely reticulate .. .. .. 2. *sereti*

Ovary and fruit glabrous or shortly pubescent on the angles only :

Outer perianth segments, 8–9 mm. long ; flowers on short stout pedicels ; leaves thickly coriaceous, oblong-elliptic, rounded or broadly cuneate at base, abruptly and shortly acuminate, 12–20 cm. long, 6–9 cm. broad, subentire or slightly denticulate towards the apex, prominently reticulate on both surfaces, the midrib sharply prominent beneath ; petiole 1·5–2 cm. long, slightly tumid in the upper half ; fruits quadrangular with smaller intermediate ridges .. .. 3. *blackii*

Outer perianth segments 4–5 mm. long ; leaves thin, or thinly coriaceous, with serrulate or dentate margins :

Flowers with distinct pedicels 2–3 mm. long ; leaves oblong-elliptic, shortly cuneate, gradually acuminate, 12–18 cm. long, 5–7 cm. broad, thinly coriaceous, serrulate ; petiole 1–1·6 cm. long, tumid at apex .. .. .. 4. *brevipedicellata*

Flowers subsessile ; leaves oblong-elliptic, rounded at base, rather long and broadly acuminate, about 12 cm. long, 4–5 cm. broad, thin, dentate ; petiole 5 mm. long 5. *assinensis*

1. **D. racemosa** *Oliv.*—F.T.A. 1 : 123. Tree, with spreading crown, to 45 ft. high ; flowers yellowish.
S.Nig.: Ikwette Plateau, 5,500 ft. (Dec.) *Keay & Savory* FHI 25184 ! **Br.Cam.:** Cam. Mt., 2,000–5,000 ft. (fl. Dec., Jan., fr. Apr.) *Mann* 2149 ! *Maitland* 839 ! 1127 ! *Dunlap* 9 ! Bamenda, 5,000 ft. (Dec.) *Johnstone* 262/31 !

2. **D. sereti** *De Wild.* in Bull. Jard. Bot. Brux. 3 : 268 (1911). *D. lasiocarpa* Gilg in Mildbr. Wiss. Ergebn. 1907–8, 2 : 566 (1913).
Br.Cam.: Kumba Div. *Rosevear* 9 ! Also in French Cameroons and Belgian Congo.

3. **D. blackii** (*Oliv.*) *Chipp* in Kew Bull. 1923 : 265. *Pyramidocarpus blackii* Oliv.—F.T.A. 2 : 495. A tree, 25 ft. high ; flower buds red, corolla white.
S.Nig.: Oban *Talbot* 1274 ! **Br.Cam.:** S. Bakundu F.R. (Apr.) *Ejiofor* FHI 29317 ! Also in Gabon and Spanish Guinea.

4. **D. brevipedicellata** *Chipp* l.c. 265 (1923). A glabrous shrub, or tree.
G.C.: Mim, Ashanti (Apr.) *Thompson* 52 ! Ofin Headwater F.R. (Apr.) *Andoh* FH 4174 ! Afram Headwaters F.R. (Apr.) *Andoh* FH 4735 !

5. **D. assinensis** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 159 (1927) ; Kew Bull. 1928 : 30 ; Chev. Bot. 39, name only. A shrub or tree (?).
Iv.C.: Assinie (Apr.) *Chev.* 17872 !

2. SCOTTELLIA Oliv. in Hook. Ic. Pl. t. 2265 (1893).

Leaves broadly elliptic to ovate-elliptic, very rarely obovate-elliptic ; obtuse to subcordate at base ; usually well over 8 cm. long ; inflorescence axes stout, 1–1·5 mm. diam. when mature, 8–20 cm. long :

Leaves subcordate to rounded at base, margin entire, abruptly and obtusely acuminate, 8–21 cm. long, 5–12 cm. broad ; pedicels 5–11 mm. long ; fruits 6–8 mm. diam. 1. *leonensis*

Leaves obtuse to rounded at base, margin undulate-serrate at least in part :

Pedicels 4–9 mm. long ; fruits 8–14 mm. diam.; leaves broadly-elliptic to ovate-elliptic, rarely obovate-elliptic, obtuse at apex or obtusely acuminate, margin undulate-serrate in the upper $\frac{2}{3}$, 7–18 cm. long, 3–9 cm. broad ; a spreading, waterside tree.. .. .. 2. *mimfiensis*

Pedicels 2–4 mm. long ; fruits 3–5 mm. diam. ; leaves broadly elliptic, shortly and broadly acuminate, margin undulate from the base, 6–18 cm. long, 4–11 cm. broad ; a tall tree with straight bole and compact crown .. 3. *chevalieri*

Leaves obovate to obovate-elliptic, cuneate or rarely obtuse at base, shortly and broadly acuminate, margin more or less entire in the lower $\frac{2}{3}$, undulate-serrate in the upper $\frac{1}{3}$, 5–16 cm. long (crown leaves rarely exceeding 8 cm.), 2·5–5 cm. broad ; inflorescence axes slender, 4–9 cm. long, pedicels 3–9 mm. long ; fruits 5–6 mm. diam. .. .. 4. *coriacea*

1. **S. leonensis** *Oliv.* in Hook. Ic. Pl. t. 2265 (1893). *S. macropus* Gilg & Dinkl. in Engl. Bot. Jahrb. 40 : 445 (1908). Tree to 40 ft. high (to 175 ft. *fide* Linder) in swamp forest at edge of water ; flowers white, strongly scented.
S.L.: Luseniya, Samu *Sc. Elliot* 4065 ! Hangha (Sept.) *Aylmer* 605 ! Gegbwema (fr. Dec.) *Deighton* 3821 ! Kamakwie (fr. Feb.) *Deighton* 4181 ! Kegga (Nov.) *Adames* 104 ! **Lib.:** Gbanga (Oct.) *Linder* 1194 ! Grand Bassa *Dinklage* 2089 ! (See Appendix, p. 48.)

2. **S. mimfiensis** *Gilg* in Engl. Bot. Jahrb. 40 : 448 (1908). *S. chevalieri* of Kennedy For. Fl. S. Nig. 30. Spreading tree in swamp forest at edge of water, to 30 ft. high (to 100 ft. in French Cameroons) ; flowers cream.
S.Nig.: R. Jamieson, Sapoba (Nov.–Jan.) *Kennedy* 2041 ! *A. F. Ross* 235 ! *Keay* FHI 24689 ! *Brenan* 8937 ! *Meikle & Keay* 526 ! Also in French Cameroons.

3. **S. chevalieri** *Chipp* in Kew Bull. 1923 : 265 ; Aubrév. Fl. For. C. Iv. 3 : 6, t. 245, 1–2. *S. kamerunensis* of Chev. Vég. Util. 5 : 148, not of Gilg. Forest tree, to 150 ft. high and 5 ft. girth, with small buttresses, straight clear bole and compact crown ; flowers white, ripe seeds red.
Iv.C.: Kapiecrou (Jan.) *Chev.* 16182 ! Sassandra Port (May) *Chev.* 17920 ! Rasso *Aubrév.* 143 ! **G.C.:** Tafo (Nov.) *Darko* 156 ! Jimira F.R. (July) *Vigne* 3012 ! Ntakem (July) *Vigne* 183 !

4. **S. coriacea** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 160 (1927) ; Kew Bull. 1928 : 31 ; Chev. Bot. 39, name only. *S. kamerunensis* Gilg l.c. 40 : 447 (1908), partly ; F.W.T.A., ed. 1, 1 : 160 (excl. descr. in key) ; Aubrév. l.c. 8, t. 245, 3–5. Forest tree, to 100 ft. high and 5 ft. girth (rarely more), with straight bole with slight flutings near base, and small compact crown ; flowers white or yellowish, ripe seeds red. **S.L.:** Taiama (Mar.) *Deighton* 3374 ! **Lib.:** Dukwia R. (fr. Sept., Dec.) *Cooper* 292 ! 369 ! **Iv.C.:** Mudjika (Oct.) *Aubrév.* 1691 ! Alépe (fr. Mar.) *Chev.* 16231 ! Mid. Sassandra to Mid. Cavally (fr. June) *Chev.* 19196 ! **G.C.:** Birrim F.R. (Apr.) *Vigne* 2883 ! Esuboni F.R. (Oct.) *Jumah* FH 5465 ! **S.Nig.:** Oni, Ondo *Sankey* 16 ! Omo F.R. (May) *Jones* FHI 16949 ! 17226 ! Sapoba (fl. Apr.–July, fr. May–Aug.) *Kennedy* 1273 ! 1674 ! Oban *Talbot* ! Also in French Cameroons and Gabon. (See Appendix, p. 48, under *S. kamerunensis* Gilg).

S. kamerunensis Gilg l.c. 447 is based on three specimens collected by *Zenker* in the French Cameroons, none of which is cited as the holotype. Duplicates of these specimens are at Kew and it appears that only *Zenker* 2646 agrees with the description in the important character of the rounded to subcordate leaf-base. The other two specimens (*Zenker* 3018 and 3031) have the leaves cuneate to obtuse at the base and are evidently *S. coriacea* A. Chev. ex Hutch. & Dalz. *S. kamerunensis* Gilg in this limited sense is not recorded from our area and many of the specimens from the Ivory Coast and French Cameroons which have been so named are *S. coriacea.* The species in this genus are however poorly defined and the treatment given here may well have to be modified when better specimens and field observations are available.—R.W.J.K.

3. CAMPTOSTYLUS Gilg in Notizbl. Bot. Gart. Berl. 2 : 57 (1898).

Pedicels 1–2 cm. long ; mature flower-buds about 1 cm. long, petals 1·5–2 cm. long ; leaves elliptic, abruptly and obtusely acuminate, 17–30 cm. long, 8–14 cm. broad ; petiole 3–5 cm. long .. .. 1. *mannii*

Pedicels scarcely 1 mm. long ; mature flower-buds about 4 mm. long, petals about 5 mm. long ; leaves elliptic, shortly cuneate, abruptly and obtusely acuminate, 12–15 cm. long, 4–7 cm. broad ; petiole about 2 cm. long ; fruit about 6 cm. long, narrowly ellipsoid-lanceolate, with 4–5 double longitudinal ribs .. .. 2. *ovalis*

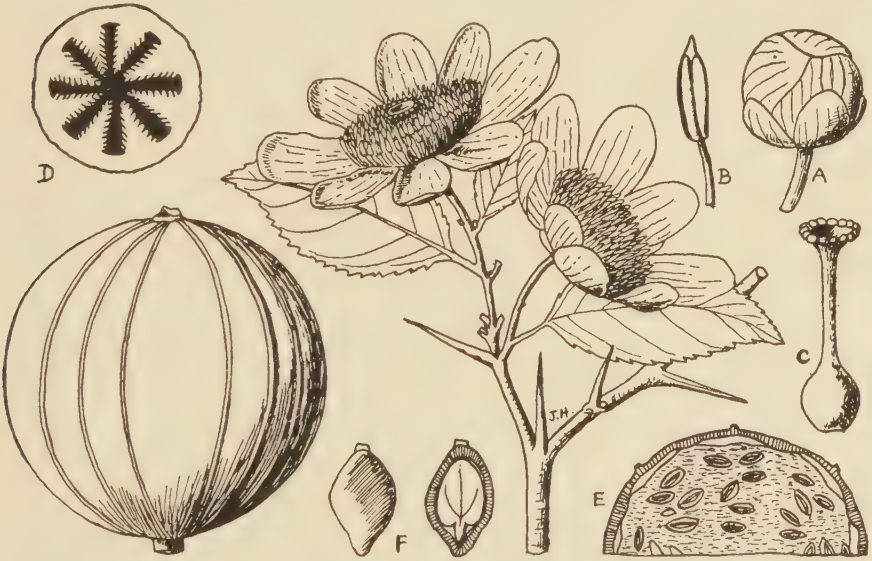

FIG. 71.—ONCOBA SPINOSA *Forsk.* (FLACOURTIACEAE).

A, flower-bud. B, stamen. C, ovary with style. D, cross-section of ovary. E, part of section of fruit. F, seed, entire and in longitudinal section.

1. **C. mannii** *(Oliv.) Gilg* in E. & P. Pflanzenfam. 21 : 398 (1925). *Oncoba mannii* Oliv. F.T.A. 1 : 117 (1868). *Caloncoba mannii* (Oliv.) Gilg in Engl. Bot. Jahrb. 40 : 462 (1908) ; F.W.T.A., ed. 1, 1 : 161. A tree up to 50 ft. high with hard red wood ; flowers white.
S.Nig.: Calabar R. (Feb.) *Mann* 2257 ! Oban *Talbot* 1492 ! 1725 ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 11 ! Victoria (Feb.) *Maitland* 371 ! S. Bakundu F.R. (Mar.) *Brenan* 9478 ! **F.Po:** (Jan.) *Mann* 155 ! Also in French Cameroons, Gabon and Angola.
2. **C. ovalis** *(Oliv.) Chipp* in Kew Bull. 1923 : 266. *Oncoba ovalis* Oliv. F.T.A. 1 : 118 (1868). A tree 25–30 ft. high.
Br.Cam.: Cam. Mt., 3,000–4,000 ft. (fl. Dec., fr. Feb.) *Mann* 1196 ! *Deistel* 282 ! *Maitland* 1225 !

Keay FHI 28248, from Afi River F.R., Nigeria, appears to represent a new species related to *C. ovalis* (Oliv.) Chipp, but more and better material is required.

4. ONCOBA Forsk.—F.T.A. 1 : 114, partly; Gilg in Engl. Bot. Jahrb. 40 : 454 (1908).

Young shoots and leaves pubescent or hairy, with spines more or less recurved and 1·5 cm. long ; leaves elliptic, ovate to obovate, shortly acuminate, crenate-serrate, 5–10 cm. long, 3·5–6 cm. broad ; petioles up to 5 mm. long ; flowers on short lateral shoots, about 5 cm. diam. ; calyx finally falling away ; anthers not apiculate ; stigma with about 6 radiate lobes ; fruit globose, 5 cm. diam., smooth .. 1. *brachyanthera*

A glabrous shrub or tree with straight spines several cm. long ; leaves elliptic, shortly acuminate, serrulate or crenate-serrate, up to 9 cm. long and 5 cm. broad ; petioles up to 1 cm. long ; flowers white, fragrant, 5 cm. in diam., terminal or lateral on short axillary shoots ; calyx usually persistent ; anthers apiculate ; fruit as above 2. *spinosa*

1. **O. brachyanthera** *Oliv.* F.T.A. 1 : 116 (1868) ; Chev. Bot. 37 ; Aubrév. Fl. For. C. Iv. 3 : 10. A shrub or tree, up to 30 ft. high, with handsome white sweet-scented flowers somewhat resembling the wild rose.
S.L.: Bagroo R. (fl. & fr. Apr.) *Mann* 829 ! Kabusa, Limba (Apr.) *Sc. Elliot* 5477 ! Freetown *Burbridge* 526 ! **Lib.:** Sinoe Basin *Whyte* ! Ganta (May) *Harley* 1170 ! Yratoke, Webo (July) *Baldwin* 6246 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Volta River F.R. (Mar.) *Vigne* 4357 ! **Togo:** Togo Plateau (Apr.) *Beveridge* 2948 ! **S.Nig.:** Owo F.R. (Apr.) *Jones* FHI 3500 ! 3505 ! Degema *Talbot* ! Also in Gabon.

2. **O. spinosa** *Forsk.*—F.T.A. 1 : 115 ; Chev. Bot. 37 ; Aubrév. l.c. 8. A shrub, or tree up to 40 ft. high, with thorny stem and branches ; flowers as above ; fruit hard and glossy.
Sen.: *Perrottet.* **Gam.:** *Saunders* 44 ! *Whitfield* ! **Fr.Sud., & Fr.G.:** *fide* Chev. *l.c.* **S.L.:** *Mann* 916 ! Makorogbo, Biriwa (Apr.) *Glanville* 206 ! **Iv.C.:** Bobo-Dioulasso *Aubrév.* 1826 ! **G.C.:** Cape Coast *Brass* ! Achimota (May) *Irvine* 1449 ! Dawa Matakole (Jan.) *Thomas* D.68 ! Yipala (Feb.) *Kitson* 852 ! Kulpawn R., Bantala (Apr.) *Kitson* 838 ! **Togo:** *Kersting* 590 ! Lome *Warnecke* 97 ! Kratchi *Anderson* 6 ! **Dah.:** *fide* Chev. *l.c.* **N.Nig.:** Nupe *Barter* 884 ! Zaria (June) *Lamb* 55 ! Abinsi *Dalz.* 758 ! **S.Nig.:** Lagos (Feb., May) *Dalz.* 1349 ! *Foster* 77 ! Abeokuta *Barter* 3396 ! Ado Rock *Rowland* ! Akpaka F.R. (Apr.) *Chesters* 135 ! Oban *Talbot* 444 ! 1730 ! **Br.Cam.:** Victoria (Apr.) *Maitland* 615 ! Cam. Mt., 2,300–2,800 ft. (Apr.) *Maitland* 1109 ! *Deistel* 90 ! Widespread in tropical Africa and Arabia. (See Appendix, p. 47.)

5. CALONCOBA Gilg in Engl. Bot. Jahrb. 40 : 458 (1908).

Fruits echinate :

Flowers small, borne among and just below the leaves ; sepals 6–8 mm. long ; petals 8–10 mm. long ; pedicels 1–2 cm. long ; petiole 2–3 cm. long ; leaves oblong-elliptic, rounded to broadly cuneate, abruptly acuminate, 10–30 cm. long, 4–10 cm. broad 1. *echinata*

Flowers large, borne on leafless woody stems ; sepals 1·5–2 cm. long ; petals 3–3·5 cm. long ; pedicels 2–3 cm. long ; petiole 5–22 cm. long ; leaves ovate, rounded to subcordate at base, acutely caudate-acuminate, 12–36 cm. long, 6–20 cm. broad 2. *welwitschii*

Fruits not echinate :

Stamens up to 1 cm. long, filaments as long as or only a little longer than the anthers ; sepals about 1 cm. long ; petals about 3 cm. long ; pedicels 2·5–7 cm. long ; fruit with longitudinal undulate ridges ; petiole 1·5–3 cm. long ; leaves ovate-oblong, obtuse at base ; shortly acuminate, 10–18 cm. long, 4–8 cm. broad 3. *lophocarpa*

Stamens 3 cm. or more long, filaments much longer than the anthers ; fruit smooth or grooved :

Petioles 2–3 cm. long ; leaves obovate-oblong, broadly cuneate, abruptly and shortly acuminate, 12–30 cm. long, 4·5–9 cm. broad ; sepals about 3 cm. long and 2 cm. broad ; petals about 6 cm. long and 2·5 cm. broad ; pedicels about 4 cm. long ; fruit ellipsoid, tapered at each end, beaked at apex, 5–7·5 cm. long 4. *brevipes*

Petioles 3–14 cm. long ; fruits rounded at the base :

Branches almost defoliated at flowering ; leaves ovate to broadly elliptic, broadly cuneate, acuminate, 8–18 cm. long, 4–12 cm. broad, rather thin ; sepals about 2 cm. long, not deciduous ; petals about 5 cm. long ; pedicels 1·5–2·5 cm. long ; fruit 3·5–4·5 cm. long, flattened at apex, sometimes apiculate 5. *gilgiana*

Branches leafy at flowering ; leaves elliptic to lanceolate, rounded to broadly cuneate at base, longly and sharply acuminate, 11–25 cm. long, 4–8 cm. broad, coriaceous, becoming glaucous above ; sepals about 2 cm. long, early caducous ; petals 3–6 cm. long ; pedicels 3–11 cm. long ; fruit broadly ovoid, shortly acuminate, 5–6 cm. long .. .. 6. *glauca*

1. **C. echinata** (*Oliv.*) *Gilg* in Engl. Bot. Jahrb. 40 : 464 (1908). *Oncoba echinata* Oliv. F.T.A. 1 : 118 (1868) ; Chev. Bot. 37 ; Aubrév. Fl. For. C. Iv. 3 : 10. Forest tree, to 20 ft. high ; flowers white ; fruit orange or reddish when ripe ; seeds black.
Fr.G.: Kouria *Chev.* 14930 ! **S.L.:** Bagroo R. (fr. Apr.) *Mann* 805 ! Bafodeya, Limba (fr. Apr.) *Sc. Elliot* 5576 ! Njala (July, Sept.) *Deighton* 1741 ! 2114 ! Kenema (fr. Jan., May) *Thomas* 7463 ! *Small* 71 ! **Lib.:** Dukwia R. (fl. July, fr .Nov.) *Linder* 75 ! *Cooper* 122 ! Gbanga (Sept.) *Linder* 646 ! **Iv.C.:** Abidjan *Aubrév.* 74 ! Tano R. (July) *Chipp* 306 ! **G.C.:** Essiama *Cummins* ! Amuni (July) *Vigne* 1267 ! Manso (fr. Aug.) *Howes* 954 ! Ampunyase (Aug.) *Andoh* FH 4239 ! 4243 ! Bobiri F.R. (fr. Feb.) *Foggie* FH 4966 ! (See Appendix, p. 46.)

2. **C. welwitschii** (*Oliv.*) *Gilg* l.c. 462 (1908). *Oncoba welwitschii* Oliv. F.T.A. 1 : 117 (1868). Forest shrub or tree, to 30 ft. high ; flowers white.
Br.Cam.: *Preuss* 36 ! Kumba (fr. Apr.) *Ejiofor* FHI 14019 ! Also in French Cameroons, Gabon, Congo and Angola.

3. **C. lophocarpa** (*Oliv.*) *Gilg* l.c. 462 (1908). *Oncoba lophocarpa* Oliv. F.T.A. 1 : 117 (1868). Forest tree, 30–40 ft. high ; petals white, stamens yellow.
Br.Cam.: Cam. Mt., near Buea, 2,000–5,000 ft. (Dec., Jan.) *Mann* 1195 ! 2162 ! *Maitland* 209 ! *Keay* FHI 28648 !

4. **C. brevipes** (*Stapf*) *Gilg* l.c. 459 (1908) ; Aubrév. Fl. For. C. Iv. 3 : 10. *Onocoba brevipes* Stapf in J. Linn. Soc. 37 : 84 (1905). Forest tree, to 50 ft. high ; flowers white.
S.L.: Damawulo, Tunkia (fl. & fr. Dec.) *Deighton* 3830 ! Jau, Tunkia (Oct.) *Deighton* 5219 ! Kenema to Zimmi (Nov.) *King* 287 ! Juru (fr. Nov.) *Migeod* ! **Lib.:** Monrovia *Whyte* ! Gbanga (Sept.) *Linder* 719 ! Suah Koko *Linder* 365 ! Dukwia R. (fl. Oct., fr. Feb., May, Oct.) *Cooper* 89 ! 173 ! 470 ! Ganta (Sept.) *Harley* ! **Iv.C.:** *fide* Aubrév. *l.c.*

5. **C. gilgiana** (*Sprague*) *Gilg* l.c. 460 (1908) ; Aubrév. l.c. 12. *Oncoba gilgiana* Sprague in Bull. Herb. Boiss. 5 : 1164 (1905). *C. glauca* of Chev. Bot. 38, not of Gilg. Shrub or tree, to 20 ft. high, with thorny stem ; flowers white ; especially in fringing forest.
S.L.: Buyabuya, R. Scarcies *Sc. Elliot* 4764 ! Borbana (Mar.) *Glanville* 176 ! Njala (fr. May) *Deighton* 2645 ! Kenema (fr. Apr.) *Deighton* 4292 ! **Iv.C.:** *fide* Aubrév. *l.c.* **G.C.:** Koforidua (Mar.) *Johnson* 907 ! Kibbi (Dec.) *Johnson* 520 ! Nsawam to Swedru *King-Church* 932 ! Kunso, Ashanti (Feb.) *Chipp* 109 ! Obuasi (Jan.) *Soward* 647 ! **Togo:** Lome (Mar.) *Warnecke* 84 ! Kpeve (Mar.) *Williams* 72 ! **S.Nig.:** Lagos (Dec.) *Barter* 20136 ! *Moloney* 17 ! *Millen* 46 ! *Dalz.* 1085 ! (See Appendix, p. 47.)

6. **C. glauca** (*P. Beauv.*) *Gilg* l.c. 459 (1908). *Ventenatia glauca* P. Beauv. (1805). *Oncoba glauca* (P. Beauv.) Hook. f.—F.T.A. 1 : 117. *Caloncoba dusenii* Gilg l.c. ; F.W.T.A., ed. 1, 1 : 161. Tree, to 40 ft. high ; petals white, stamens orange ; fruit edible.
N.Nig.: Ibaji-Ojuku F.R., Kabba (Feb.) *Taylor* L. 7 ! **S.Nig.:** Ajilite *Millen* ! Benin (Nov.) *Kennedy* ! Omo F.R. (Apr.) *Jones* FHI 17282 ! Awka *Thomas* 116 ! Insofan (Jan.) *Holland* 210 ! 247 ! Calabar (Sept.) *Unwin* 40 ! Oban *Talbot* 1262 ! **Br.Cam.:** Ambas Bay (fl. & fr. Feb.) *Mann* 18 ! Mamfe (Jan.) *Maitland* 1157 ! Batibo, Bamenda (Jan.) *Russell* FHI 28414 ! **F.Po:** (Nov.) *T. Vogel* 115 ! 224 ! *Mann* 258 ! Also in French Cameroons, Spanish Guinea and Gabon. (See Appendix, p. 47.)

6. LINDACKERIA C. Presl Rel. Haenk. 2 : 89, t. 65 (1835).

Leaves oblong-elliptic to ovate, truncate, rounded or narrowed at base, shortly acuminate, margin irregularly dentate or almost entire, 15–22 cm. long, 7–12 cm. broad ; main lateral nerves 6–10 pairs ; petioles 3–16 cm. long ; inflorescence 5–10 cm. long, flowers in fascicles of 5 or solitary ; sepals 3, about 5 mm. long ; petals 6–10, up to 5–10 mm. long ; ovary hairy, becoming echinate in fruit .. .. .. *dentata*

L. dentata (*Oliv.*) *Gilg* in Engl. Bot. Jahrb. 40 : 465 (1908) ; Chev. in Rev. Bot. Appliq. 27 : 2 (1947), incl. var. *salicifolia* A. Chev. *Oncoba dentata* Oliv. F.T.A. 1 : 119. *L. caillei* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 162 (1927) ; Chev. l.c. 27 : 4 (1947) ; Chev. Bot. 38, name only. A shrub, or tree to 50 ft. high ; flowers white ; fruits orange.
Fr.G.: Ditinn (Apr.) *Chev.* 12172 ! Nzo *Chev.* 21040 ! **S.L.:** Laoma (Jan.) *Aylmer* 586 ! Limba country (Apr.) *Sc. Elliot* 5488 ! 5632 ! Njala (Aug.) *Deighton* 1828 ! Kangama (fl. Apr., fr. July) *Deighton* 3194 ! 5119 ! **Iv.C.:** Abidjan (fr. July) *Aubrév.* 62 ! Banco *Aubrév.* 411 ! Mt. Tonkui *Aubrév.* 995 ! **G.C.:** Kwahu (Apr.) *Johnson* 656 ! Aburi (Apr.) *Johnson* 1100 ! Kumasi (Mar.) *Vigne* 1651 ! Apedwa, Kibbi (fr. Aug.) *Miles* 579 ! **S.Nig.:** Lagos *Foster* 70 ! Ibadan (Apr.) *Meikle* 1391 ! Onitsha *Barter* 1655 ! Eket *Talbot* ! Oban *Talbot* 1425 ! Calabar (Feb.) *Mann* 2267 ! **Br.Cam.:** near Buea (fl. Jan.–Apr., fr. Sept.) *Mann* 1177 ! *Maitland* 189 ! 753 ! Fonfuka, Bamenda (fr. June) *Maitland* 1548 ! Extends through Cameroons and Congo to A.-E. Sudan and Angola. (See Appendix, p. 47.)

7. FLACOURTIA L'Hérit.—F.T.A. 1 : 120.

Leaves more or less oval, generally rounded at the apex, but sometimes obtuse, venation reticulate.. .. .. 1. *flavescens*
Leaves oblong, apex acute, veins markedly parallel to each other between the nerves 2. *vogelii*

1. **F. flavescens** *Willd.*—F.T.A. 1 : 121 (excl. syn. *F. vogelii* Hook. f.) ; Chev. Bot. 38 ; Aubrév. Fl. For. Soud.-Guin. 72. A shrub or small tree with thorny stem, up to 30 ft. high ; berry red or purple, edible, the Niger Plum. Mainly in savannah regions by rocks and in fringing forest.
Sen.: *Heudelot* 349 ! **Fr.Sud.:** Bamako (Apr.) *Hagerup* 42 ! **Iv.C.:** Bobo-Dioulasso (June) *Aubrév.* 1892 ! Koualé (fr. May) *Chev.* 21743 ! Mt. Kamoueniboka (July) *Chev.* 22020 ! **G.C.:** Abokobi (Feb.) *Irvine* 1991 ! Achimota (fr. June) *Milne-Redhead* 5095 ! Lawra (May) *Vigne* 4509 ! Pong to Nakaw (Mar.) *Kitson* 873 ! **Togo:** Lome *Warnecke* 320 ! **Dah.:** *Burton* ! **N.Nig.:** Nupe *Barter* 1687 ! Anara F.R. (May) *Keay* FHI 25781 ! **S.Nig.:** Abeokuta *Barter* ! Oyo (Feb.) *Keay* FHI 22479 ! Also in Ubangi-Shari, French Cameroons and Angola. (See Appendix, p. 47.)

2. **F. vogelii** *Hook. f.* in Fl. Nigrit. 220 (1849) ; Aubrév. l.c. 72. *F. flavescens* of F.T.A. 1 : 121, partly. A shrub or small tree, up to 30 ft. high ; similar to above, but apparently mainly in forest.
S.L.: Rokupr (Feb., June) *Deighton* 5361 ! *Jordan* 445 ! Musaia (young fr. July) *Deighton* 4803 ! Njala (Mar.) *Deighton* 2621 ! **S.Nig.:** Abo *Barter* 162 ! Ibo country *T. Vogel* 34 ! **Br.Cam.:** Likomba *Mildbr.* 10762 ! Also in Ubangi-Shari.

Besides the above, *F. indica* (Burm. f.) Merr. (syn. *F. ramontchii* L'Hérit.) is sometimes cultivated in our area ; it is widespread in east and south tropical Africa.

8. OPHIOBOTRYS Gilg in Engl. Bot. Jahrb. 40 : 514 (1908).

A tree ; young branches puberulous ; leaves elliptic, shortly cuneate at base, obliquely acuminate at apex, 7–14 cm. long, 2·5–5·5 cm. broad, entire, glabrous ; lateral nerves about 4 pairs, prominently looped ; petiole about 1 cm. long ; panicle with slender long branches, tomentellous ; flowers subsessile ; sepals obovate, 2 mm. long, glabrous ; stamens 5–6, alternate with the sepals ; disk-glands large and hairy ; ovary tomentose ; capsule 1·5 cm. long .. .. *zenkeri*

O. zenkeri *Gilg* in Engl. Bot. Jahrb. 40 : 516, t. 2 (1908) ; Aubrév. Fl. For. C. Iv. 3 : 8, t. 246. Forest tree, to 100 ft. high, with buttresses and clear bole up to 5 ft. in girth ; flowers whitish or pinkish-white.
Iv.C.: Agboville-Abengourou (fl. June, fr. Aug.) *Aubrév.* 1390 ! **G.C.:** E. Akim (June) *Johnson* 737 ! 739 ! Kwahu Prasu (June) *Vigne* 1753 ! **S.Nig.:** Ikom (July) *Catterall* 9 ! 43 ! 92 ! **Br.Cam.:** Victoria (Feb., June) *Maitland* 425 ! 715 ! Okunde, Kumba (June) *Rosevear* 56/31 ! Also in French Cameroons and Gabon. (See Appendix, p. 48.)

9. DOVYALIS E. Mey. ex Arn. in Hook. Journ. Bot. 3 : 251 (1841) ; Gilg in Engl. Bot. Jahrb. 40 : 504 (1908).

Leaves oblong-elliptic, shortly and gradually acuminate, obtusely rounded at base, about 6 cm. long and 2·5 cm. broad, pubescent on the nerves and petiole ; spines 1·5 cm. long, straight ; male flowers in axillary fascicles ; fruits more or less globose, fleshy, about 3 cm. diam., with reflexed sepals at the base .. .. 1. *afzelii*
Leaves ovate-elliptic, acutely and fairly long-caudate-acuminate, mostly rather broadly rounded at base, up to 9 cm. long and 5 cm. broad, minutely puberulous on the nerves ; spines up to 2 cm. long ; male flowers in axillary fascicles, hoary-pubescent 2. *zenkeri*

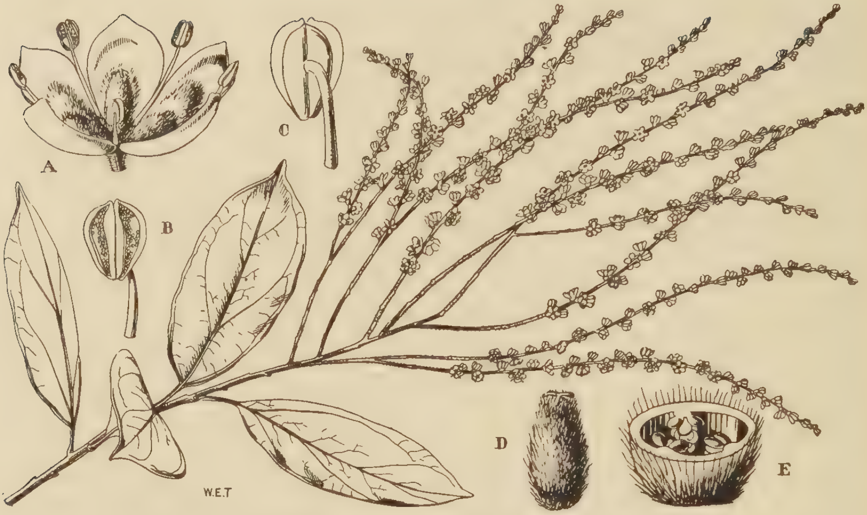

FIG. 72.—OPHIOBOTRYS ZENKERI *Gilg* (FLACOURTIACEAE).
A, flower. B, C, stamens, front and back. D, ovary. E, cross-section of ovary.

1. **D. afzelii** *Gilg* in Engl. Bot. Jahrb. 40 : 507 (1908). A shrub or spiny tree.
   S.L.: *Afzelius.* Near Regent (fr. Dec.) *Sc. Elliot* 4008! MacDonald Town (fr. Dec.) *Deighton* 3351! Njala (fl. Sept., Dec., fr. Dec.) *Deighton* 2562! 3024! Rokupr (May) *Jordan* 268!
2. **D. zenkeri** *Gilg* l.c. (1908). A shrub or small tree, 12–18 ft. high, more or less densely spiny.
   S.Nig.: Oban, *Talbot* 1261! Also in French Cameroons.

A revision of the W. African species of this genus has not been undertaken for this edition, but it is clearly necessary. The plants are dioecious and specimens should be collected from both male and female shrubs, and should include mature fruits and show the range of variation in leaf-shape. In addition to the above species, I have seen the following, which may or may not prove to be distinct :—

Imperfectly known species.

1. **D.** sp. **A.**
   Fr.G.: Macenta (Oct.) *Baldwin* 9845! **S.L.:** Rokupr (May) *Jordan* 270!
2. **D.** sp. **B.**
   S.L.: Binkolo (Aug.) *Thomas* 1791! 1810! Magbile (Dec.) *Thomas* 6060! 6093! Giema, Dama (Jan.) *Deighton* 3895!
3. **D.** sp. **C.**
   G.C.: Ampunyase (Feb.) *Andoh* FH 4136! **S.Nig.:** Olokemeji (fl. & young fr. Sept.) *Jones* FHI 20261!

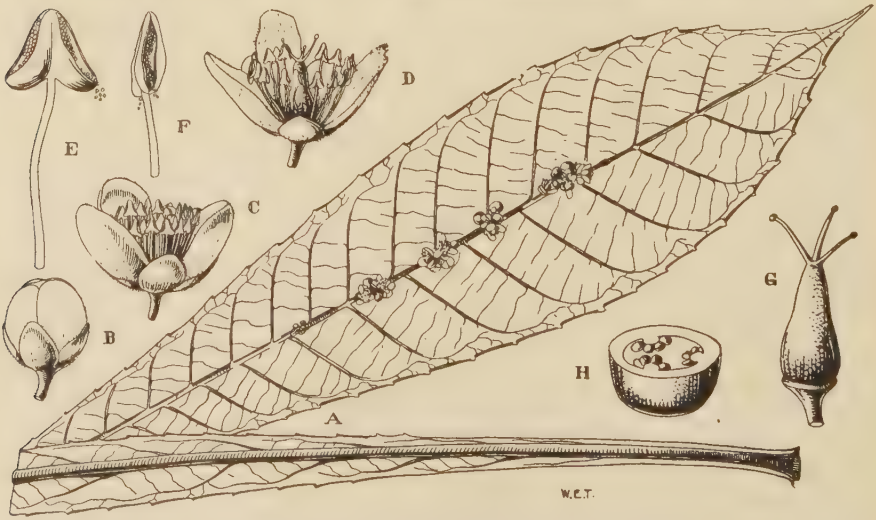

FIG. 73.—PHYLLOBOTRYUM SOYAUXIANUM *Baill.* (FLACOURTIACEAE).
A, leaf with adnate inflorescence. B, flower-bud. C, male flower. D, hermaphrodite flower. E, F, stamens. G, ovary with styles. H, ovary in cross-section.

10. PHYLLOBOTRYUM Muell. Arg. in Flora 47 : 534 (1864).

Leaves clustered at apex of stem, elongate-oblanceolate, gradually narrowed to the scarcely petiolate base, cuspidate-acuminate, up to 1 m. long and 17 cm. broad, crenulate-serrate, with numerous spreading lateral nerves, glabrous ; stipules lanceolate, about 2·5 cm. long ; inflorescence completely adnate to the upper surface of the midrib, up to $\frac{3}{4}$ of its length ; flowers about 12 mm. diam., clustered, shortly pedicellate ; sepals shortly ciliate ; capsule ovoid, beaked, wrinkled, about 18 mm. long and 12 mm. diam., dehiscent by 3 valves, with about 5 white seeds *soyauxianum*

P. soyauxianum *Baill.* in Bull. Soc. Linn. Paris 1 : 287 (1881). *P. zenkeri* Gilg in Engl. Bot. Jahrb. 40 : 500 (1908). *P. spathulatum* of Cat. Talb. 121, not of Muell. Arg. Sparingly branched erect shrub or small tree, to 12 ft. high ; leaves closely clustered at the ends of the branches, reddish when young ; sepals and petals mauve, stamens cream, ovary light red, style deep purple-red ; fruits red.
S.Nig.: Oban *Talbot* 24 ! 26 ! Obutong, Oban (Mar.) *Onochie* FHI 7714 ! **Br.Cam.:** Johann-Albrechtshöhe (fl. & fr. Mar.) *Staudt* 865 ! S. Bakundu F.R. (fl. & fr. Mar., fr. June) *Brenan* 9306 ! *Olorunfemi* FHI 30648 ! R. Bombe, Ndifo, Kumba (fr. Apr.) *Ejiofor* FHI 29368 ! Also in French Cameroons.

54. DIONCOPHYLLACEAE

Scandent shrubs or lianes. Leaves simple, alternate, exstipulate, elongate, with numerous close parallel nerves, sometimes hooked at the apex, or some leaves very narrow and linear bearing stalked glands. Inflorescences cymose, more or less supra-axillary. Flowers hermaphrodite, actinomorphic. Sepals 5, free or connate at the base in a short tube, valvate. Petals 5, free, contorted, caducous. Disk absent. Stamens hypogynous, 10 or 25–30, free or slightly connate, straight ; anthers 2-celled, elongate-linear or shortly ellipsoid. Ovary superior, unilocular, of 2–5 carpels, early loculicidally dehiscent, each valve with a median parietal placenta ; ovules anatropous, few ; styles 2–5, free or subconnate at the base, filiform or plumose-laciniate. Fruits capsular, but opening when very young, with 2–5 open spreading valves. Seeds few, large, disciform, broadly winged, with a stout peltately attached funicle articulated at apex, hanging from the open valves of the fruit ; seeds developing in the open from a very early stage ; embryo large, discoid-obconical, axile ; radicle very short, opposite the hilum ; endosperm copious, cap-shaped, surrounding most of the embryo.

A West African family of three genera, previously included in the *Flacourtiaceae*. Recognized by the large, disciform, winged seeds, with peltately attached funicle, developing in the open, and by the elongate leaves often hooked at the apex or heteromorphous.

Styles 2, filiform, unbranched ; valves of " capsule " 2, suborbicular, small ; stamens 10, nearly as long as the large, delicate petals ; sepals large, elongate-elliptic, closed in bud ; inflorescences rather dense-flowered, conspicuously bracteate ; seed-body large (4·5–5·5 cm. diam.), with a relatively narrow non-shining wing ; petioles stout, not articulate ; leaves often hooked at apex .. .. 1. **Habropetalum**

Styles 5 (sometimes 3 ?), much branched above ; valves of " capsule " 4–5, elliptic to oblanceolate-spathulate ; stamens 10, much shorter than the relatively small, thick, subcoriaceous petals ; sepals small, deltoid, open in bud ; inflorescences lax, few-flowered, bracts small and inconspicuous ; seed-body small (1·2–1·4 cm. diam.), with a very broad shining wing ; petioles slender, articulated, base persistent ; leaves trimorphic (hook-bearing on the long shoots, simple on the short shoots in their axils and occasionally on the young plants reduced to the midrib which bears numerous long-stipitate glands) .. .. 2. **Triphyophyllum**

1. **HABROPETALUM** Airy Shaw in Kew Bull. 1951 : 334 (1952).

Stems finely striate, with conspicuous rusty furfuraceous indumentum ; leaves elongate-oblong, cuneate at base, obtuse at apex, 12–45 cm. long, 2·5–5·5 cm. broad, midrib produced at apex and often bearing a pair of hooks ; cymes axillary and terminal, bracts elliptic, up to 2 cm. long, sepals elongate-elliptic, 10–13 mm. long ; petals spathulate-obovate, about 1·5 cm. long ; filaments about 12 mm. long ; styles 2, filiform with capitate stigmas ; ovary obovoid ; " capsule " 2-valved, the open valves suborbicular, about 8 mm. diam. ; seeds 1–2 per valve ; funicle 2–3·5 cm. long ; seed body 4·5–5·5 cm. diam., 2–3 cm. thick, surrounded by the spreading or more or less reflexed 1–2·5 cm. wide wing .. .. *dawei*

H. dawei (*Hutch. & Dalz.*) *Airy Shaw* in Kew Bull. 1951: 336, t. 1 & 2 (1952). *Dioncophyllum dawei* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 165 (1927) ; Kew Bull. 1928 : 31 ; Pellegr. in Bull. Soc. Bot. Fr. 80 : 234, 236 (1933). Shrub, often scandent, in sandy coastal scrub ; petals white, caducous.
S.L.: Mosente, Pujehun (fl. Dec., fr. Mar.) *Deighton* 5283 ! 5323 ! Mano Bonjema, Pujehun (fl. & fr. Feb.) *Dawe* 466 ! s.n. ! *Adames* 1 ! Juring (Dec.) *Deighton* 332 ! (See Appendix, p. 47.)

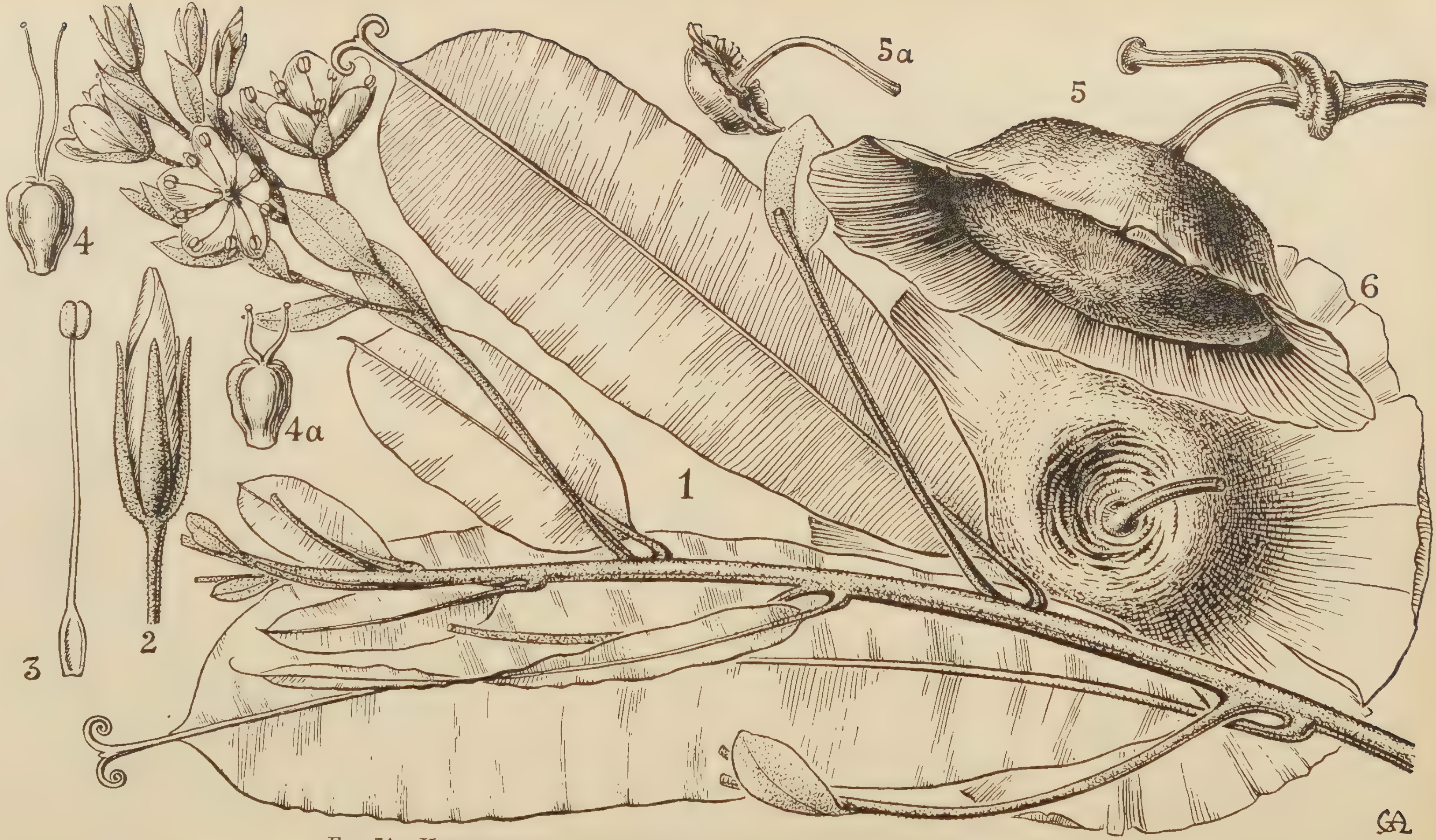

FIG. 74.—HABROPETALUM DAWEI (*Hutch. & Dalz.*) *Airy Shaw* (DIONCOPHYLLACEAE).

1, flowering branch, × 1. 2, flower bud, × 2. 3, stamen, × 8. 4, gynoecium, × 8. 4a, gynoecium with abnormally short styles, × 8. 5, fruit, showing two funicles and mature seed, × 1. 5a, young seed, × 2. 6, mature seed, in basal (ventral) aspect, × 1.

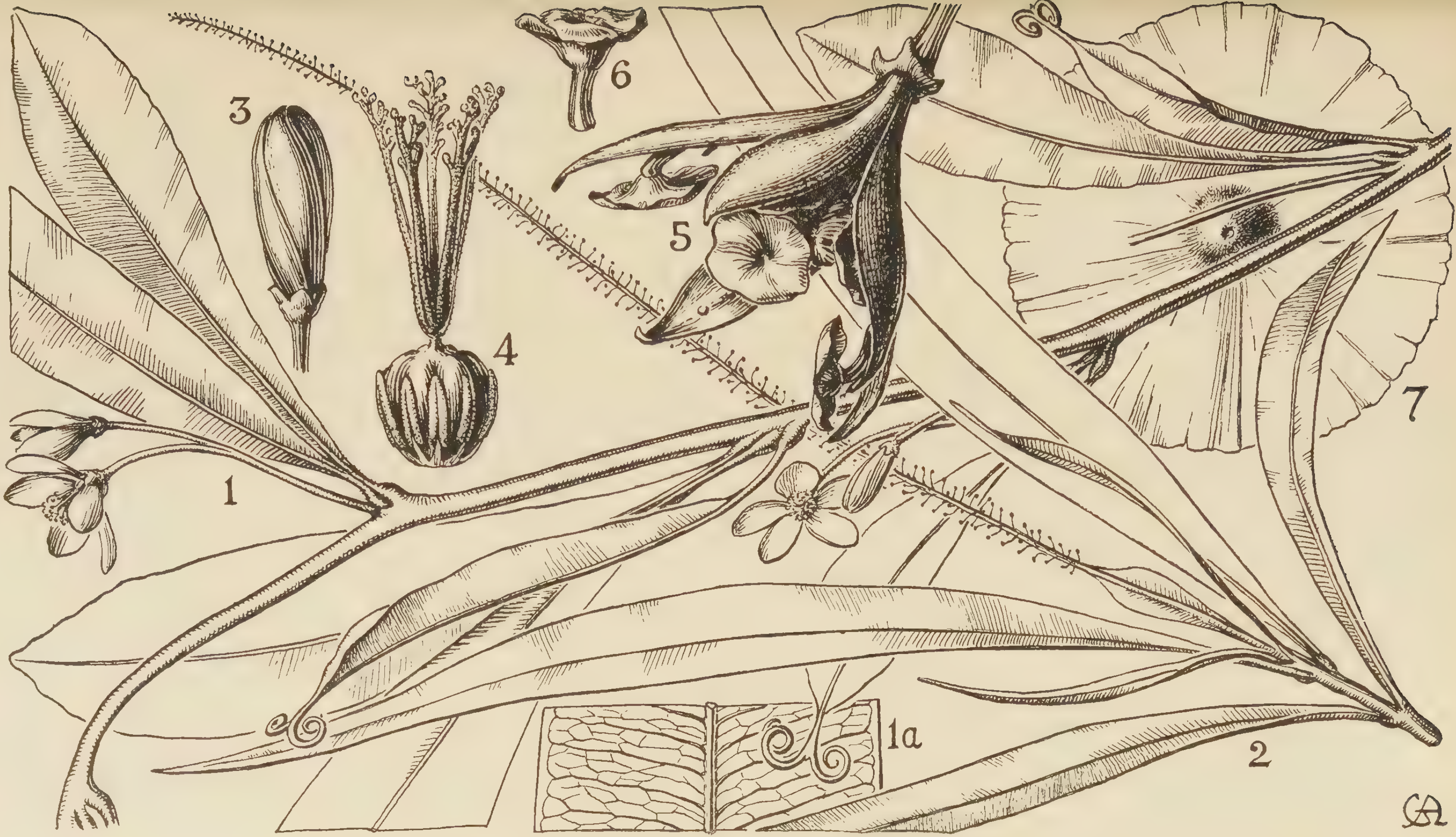

FIG. 75.—TRIPHYOPHYLLUM PELTATUM (*Hutch. & Dalz.*) *Airy Shaw* (DIONCOPHYLLACEAE).

1, flowering branch, showing hook-leaves subtending axillary short-shoots bearing hookless leaves and inflorescences (hook-leaf missing from short-shoot on left), × 1. 1a, portion of lower surface of leaf, showing venation, × 2. 2, apex of young vegetative shoot bearing elongate hookless leaves and one gland-leaf with greatly reduced lamina, × 1. 3, flower bud, × 2. 4, flower with perianth removed, showing androecium and gynoecium, × 5. 5, very young fruit, showing young seeds developing on thickening funicles, × 2. 6, young seed, × 2. 7, mature seed, in basal (ventral) aspect, × 1.

2. **TRIPHYOPHYLLUM** Airy Shaw in Kew Bull. 1951 : 341 (1952).

Stems terete, glabrous ; leaves of three kinds : (1) on long shoots, narrowly oblong-elliptic, cuneate at base, obtuse at apex, 6–16 cm. long, 1·5–3 cm. broad, midrib produced at apex to form a pair of hooks, (2) on short shoots, oblong-oblanceolate, 20–35 cm. long, 1–5 cm. broad, not hooked, (3) on sterile shoots, often reduced to the midrib which bears numerous long-stipitate glands ; cymes few-flowered, axillary ; sepals deltoid, about 2 mm. long ; petals obovate, about 13 mm. long ; filaments very short ; styles 5 (sometimes 3 ?), much branched above ; " capsule " 4–5 valved, the open valves elliptic-lanceolate, 18–27 mm. long, 7 mm. broad ; usually only 1 seed developing on each valve ; funicle up to 5·5 cm. long ; seed body 12–14 mm. diam., surrounded by the broad wing 4·5–7 cm. diam. .. .. *peltatum*

T. peltatum (*Hutch. & Dalz.*) *Airy Shaw* in Kew Bull. 1951 : 342, t. 4 & 5 (1952). *Dioncophyllum peltatum* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 165 (1927) ; Kew Bull. 1928 : 31 ; Pellegr. in Bull. Soc. Bot. Fr. 80 : 234, 236 (1933). *Ouratea glomerata* of Chev. Bot. 108, and of F.W.T.A., ed. 1, 1 : 195. Scandent shrub or liane of high forest ; flowers white.
S.L.: Makene, Bombali (Feb.) *Deighton* 5325 ! Matotaka, Tonkolili *Thomas* 1287*a* ! Newton (Feb.) *Deighton* 5001 ! Moyamba *Deighton* 1919 ! 1919*a* ! Bagroo R. *Mann* 813 ! Kenema (Jan.) *Thomas* 7674 ! Pihalla, Pujehun *Dawe* ! Zimi, Makpele (May) *Deighton* 3726 ! **Lib.:** R. Mano, Grand Cape Mount (Dec.) *Baldwin* 10809 ! Salala Dist. *Baldwin* 14045 ! 14178 ! Dukwia R. (Feb.) *Cooper* 303 ! **Iv.C.:** Tai Forest *Miége* ! Cavally Basin *Chev.* 19518 !

55. SAMYDACEAE

Trees or shrubs. Leaves simple, alternate, often pellucid-dotted or lined ; stipules small, deciduous or absent. Flowers hermaphrodite, actinomorphic, perigynous. Sepals united in the lower part, imbricate or valvate, persistent. Petals the same number or more than the sepals or absent, often persistent. Disk-glands alternate with the stamens. Stamens definite or indefinite in number, in one or more rows, sometimes in bundles opposite the petals ; staminodes often present ; filaments free or connate at the base ; anthers 2-celled, short, opening lengthwise. Ovary free or adnate to the calyx-tube, sessile, 1-celled with 3–5 parietal placentas often towards the top of the cell ; style simple or 3–5 distinct styles ; ovules few or numerous. Fruit capsular or indehiscent. Seeds with fleshy copious endosperm and fairly large embryo.

Mainly a tropical family, and very similar to the *Flacourtiaceae*, with which they have often been united ; distinguished from that family by the constantly hermaphrodite perigynous flowers which are mainly provided with persistent petals.

Petals present ; ovary partly adnate to the calyx-tube :
- Petals twice as many as the sepals ; stamens very numerous ; filaments pilose ; stipules present .. .. 1. **Dissomeria**
- Petals the same number as the sepals ; stamens few or many ; filaments not pilose :
  - Petals persistent, becoming dry, spreading and often enlarged in fruit, not hooded ; stamens singly or in bundles opposite the petals ; stipules present 2. **Homalium**
  - Petals not enlarged in fruit, often connivent, hooded, with inflexed margins ; stamens alternate with and opposite the petals ; stipules absent .. 3. **Byrsanthus**

Petals absent ; ovary free ; staminodes alternate with the fertile stamens ; stipules minute .. .. 4. **Casearia**

1. **DISSOMERIA** Benth.—F.T.A. 2 : 496.

Branchlets pubescent when young, at length marked by numerous lenticels ; leaves elliptic to obovate-elliptic, obtusely cuneate at base, obtuse or shortly acuminate, 6–11 cm. long, 3–6 cm. broad, glabrous except in the axils of the nerves, crenate with gland-tipped teeth ; lateral nerves 5–7 pairs, prominent beneath ; petiole about 4 mm. long ; stipules 5–6 mm. long, caducous ; spikes axillary, about as long as the leaves ; flowers crowded ; sepals ciliate ; petals softly pubescent outside ; filaments plumose .. .. *crenata*

D. crenata *Hook. f. ex Benth.*—F.T.A. 2 : 496 ; Aubrév. Fl. For. C. Iv. 3 : 15. Shrub or tree, to 40 ft. high ; mainly in streamside forests in the savannah regions ; flowers white.
Fr.G.: R. Niger, Farana (Mar.) *Sc. Elliot* 5313 ! **S.L.:** Sugar Loaf Mt. (Apr.) *Sc. Elliot* 5768 ! Makunde, Limba (Apr.) *Sc. Elliot* 5706 ! Mano *Smythe* ! **Iv.C.:** R. Férédougouba, Touba *Aubrév.* 1249 ! **G.C.:** between Ejura and Yeji (Apr.) *Dalz.* 52 ! Afram Plains (May) *Kitson* 1120 ! Prang (Jan., Apr.) *Kitson* 905 ! *Vigne* 1550 ! Zillimbaw Kwom (May) *Kitson* 518 ! 519 ! 755 ! **N.Nig.:** Lokoja (Sept.) *Ansell* 1 ! Koton Karifi Swamp F.R. (July) *Johnstone* FHI 3313 !

2. **HOMALIUM** Jacq.—F.T.A. 2 : 497.

Stamens in bundles of 2–4 by each petal ; leaves up to 10 cm. long and 4 cm. broad, more or less obovate, with 4–6 pairs of lateral nerves .. .. 1. *angustifolium*

Stamens solitary by each petal ; leaves usually exceeding 10 cm. long and 4 cm. broad :
  Petals 5–15 mm. long in fruit :
    Inflorescence with long slender spreading hairs, up to 25 cm. long, branched ; leaves with long pilose hairs beneath, especially on the midrib, often glabrescent, ovate-elliptic, acute to obtuse at base, acuminate, 8–18 cm. long, 3–10 cm. broad ; petals 8–10 mm. long in fruit .. .. 2. *smythei*
    Inflorescence shortly pubescent or tomentose ; leaves tomentellous, shortly pubescent or glabrous beneath :
      Leaves more or less permanently pubescent or tomentellous beneath on lamina as well as on the midrib and nerves ; lateral nerves 12–15, very prominent and more or less parallel beneath :
        Inflorescence axillary, simple, up to 15 cm. long ; leaves broadly elliptic, obtuse to rounded at base .. .. 3. *dalzielii*
        Inflorescence terminal, much-branched, 20–35 cm. long ; leaves broadly elliptic, rounded to subcordate at base :
          Lamina finely and sparingly tomentellous between the nerves beneath 4. *neurophyllum*
          Lamina densely tomentellous all over the undersurface .. 5. *patoklaense*
      Leaves glabrous, or sparingly pubescent on the midrib and nerves but not on the lamina beneath :
        Leaves cordate at base, 12–30 cm. long, 5–14 cm. broad, very coriaceous, with strong tertiary nerves ; stipules very early caducous ; inflorescence terminal, much-branched, up to 40 cm. long ; petals up to 12 mm. long in fruit 6. *letestui*
        Leaves not cordate at base :
          Leaves with minute glandular scales beneath, ovate-elliptic to oblong-elliptic, cuneate at base, sometimes unequally so, obtuse to acuminate at apex, 6–12 cm. long, 3–6 cm. broad ; inflorescence simple, axillary, up to 20 cm. long, stout ; flowers in clusters, pedicels persistent ; petals 5 mm. long in fruit 7. *viridiflorum*
          Leaves without scales beneath :
            Inflorescence axillary, simple, or appearing compound by the fall or non-development of the leaves ; leaves 8–20 cm. long, 5–10 cm. broad :
              Petals in fruit 6–8 mm. long ; leaves cuneate at base, usually coarsely (rarely obscurely) crenate, drying greyish-brown .. .. 8. *aylmeri*
              Petals in fruit 10–15 mm. long ; leaves rounded or obtuse at base, rather obscurely crenate, drying reddish-brown .. .. .. 9. *macropterum*
            Inflorescence truly compound ; leaves 4–13 cm. long, 2·5–6 cm. broad :
              Inflorescence axillary, up to 15 cm. long, densely brownish pubescent ; pedicels 2 mm. long, articulated near the apex ; stipules minute and early caducous ; leaves gradually acuminate ; mature fruit unknown .. 10. *aubrevillei*
              Inflorescence terminal, 11–25 cm. long, greyish puberulous ; pedicels 3 mm. long, articulated 1 mm. from the base ; stipules linear, 4–5 mm. long, persistent ; leaves abruptly acuminate ; petals up to 8 mm. long in fruit 11. *angustistipulatum*
  Petals up to 3 mm. long in fruit ; inflorescence much-branched :
    Flowers in dense clusters along the axes ; stamens up to 2 mm. long ; stipules foliaceous, reniform, often persistent ; leaves obtuse to cordate at base :
      Leaves permanently and softly pubescent beneath ; branchlets densely pubescent 12. *molle*
      Leaves glabrous beneath ; branchlets sparingly pubescent :
        Leaves obtuse to rounded at base, petiole 5–15 mm. long ; stipules up to 8 mm. diam., usually early caducous .. .. 13. *africanum*
        Leaves cordate to subcordate at base, petiole 2–5 mm. long ; stipules 10–25 mm. diam., usually persistent .. .. 14. *sarcopetalum*
    Flowers not in dense clusters, pedicels 2 mm. long, distinct, or 2–4 flowers together ; stamens 5–6 mm. long ; stipules subulate, very early caducous ; leaves cuneate at base, glabrous ; mature fruit unknown .. .. 10. *aubrevillei*

1. **H. angustifolium** *Sm.*—F.T.A. 2 : 498. Small tree to 15 ft. high, with slender trunk, or straggling and shrub-like ; in riverain forest ; flowers greenish-white.
Fr.G.: Conakry *Maclaud* ! **S.L.**: *Smeathmann* ! Bawbaw *Lane-Poole* 434 ! Colonial Reserve (Jan.) *Macdonald* 7 ! Talla Hills (fr. Feb.) *Sc. Elliot* 4874 ! 5016 ! Sugar Loaf Mt. (Dec.) *Sc. Elliot* 4022 ! Tombo (Dec.) *Deighton* 3315 ! Nganyama (Sept.–Oct.) *Deighton* 4025 ! 5190 !

2. **H. smythei** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 166 (1927) ; Kew Bull. 1928 : 213. *H. djalonis* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 166 (1927) ; Kew Bull. 1928 : 212 ; Chev. Bot. 283, name only. *H. alnifolium* Hutch. & Dalz. l.c., partly. Tree, to 30 ft. high ; inflorescences drooping ; flowers cream or greenish ; wood very hard.
Fr.G.: Diaguissa Plateau (Apr.) *Chev.* 12692 ! Dalaba (Apr.) *Caille* in *Hb. Chev.* 18220 ! **S.L.**: *Smythe* 55 ! Pujehun (Feb.) *Aylmer* 7 ! Bunabu (Mar.) *Lane-Poole* 16 ! Panguma (Mar.) *Lane-Poole* 19 ! Mano (Mar.) *Deighton* 1923 ! Jaiama (fr. Mar.) *Edwardson* 70 ! Kwaoma (Apr.) *Deighton* 3681 ! **Lib.**: Dukwia R. (fl. Mar., fr. May) *Cooper* 324 ! 469 ! (See Appendix, p. 49.)

3. **H. dalzielii** *Hutch.* F.W.T.A., ed. 1, 1 : 166 (1927) ; Kew Bull. 1928 : 211. A tree, up to 40 ft. high.
Dah.: Porto Novo (Mar.) *Chev.* 23331 ! **S.Nig.**: Lagos (Dec., Jan.) *Millen* 42 ! *Dalz.* 1259 ! 1356 !

4. **H. neurophyllum** *Hoyle* in Kew Bull. 1932 : 265. *H. dananensis* Aubrév. & Pellegr. in Aubrév. Fl. For. C. Iv. 3 : 20, t. 250 (1936), French descr. only. A forest tree, to 75 ft. high or more ; wood very hard.

Iv.C.: Danané (Mar.) *Aubrév.* 1121! **G.C.:** Ofinso (fr. June) *Vigne* 1181! Ainyam (fr. June) *Vigne* 179! S. Scarp F.R. *Moor* FH 2348! (See Appendix, p. 49.)

5. **H. patoklaense** *Aubrév. & Pellegr.* in Aubrév. Fl. For. C. Iv. 3 : 18, t. 249 (1936). A medium-sized tree.
Iv.C.: Patokla (May) *Aubrév.* 1302!

6. **H. letestui** *Pellegr.* in Bull. Mus. Hist. Nat. 27 : 193 (1921). *H. dolichophyllum* Gilg ex Engl. Pflanzenw. Afr. 3, 2 : 579 (1921) ; F.W.T.A., ed. 1, 1 : 166 ; Hutch. & Dalz. in Kew Bull. 1928 : 212 ; Aubrév. l.c. 3 : 18, t. 251. *H. africanum* of Gilg in Engl. Bot. Jahrb. 40 : 488 and of Chev. Bot. 283, not of (Hook. f.) Benth. Forest tree, to 100 ft. high ; leaves glossy, with midrib and nerves reddish-purple beneath when young ; flowers whitish at first, petals becoming wine-red and finally cream-coloured in fruit ; wood very hard.
Fr.G.: Rio Nunez *Heudelot* 810! Kouroussa (Jan.) *Pobéguin* 640! **S.L.:** Talla Hills (Apr.) *Sc. Elliot* 5532! Bandajuma (Feb.) *Lane-Poole* 150! Njala (Mar.) *Deighton* 2868! Batkanu (Feb.) *Deighton* 3495! **Lib.:** Jabrocca (fr. Dec.) *Baldwin* 10877! **Iv.C.:** Assinie (Apr.) *Chev.* 16316! Tai *Aubrév.* 1208! **G.C.:** Winnebah (fl. & fr. Feb.) *Dalz.* 8302! Prestea (Oct.) *Vigne* 163! Kumasi *Vigne* 1040! **N.Nig.:** Lapai (Feb.) *Yates* 35! **S.Nig.:** Shasha F.R. *Lancaster* 12! Okomu F.R. (fr. Feb.) *Brenan* 9113! Sapoba *Kennedy* 1666! 2089! Onitsha *Unwin* 70! Oban *Talbot* 1514! **Br.Cam.:** Victoria (fl. & fr. Jan., Feb.) *Preuss* 1379! *Maitland* 176! 178! S. Bakundu F.R. (fr. Feb.) *Ejiofor* FHI 14078! **F.Po:** (Jan.) *Mann* 232! Also in French Cameroons and Gabon. (See Appendix, p. 49.)

7. **H. viridiflorum** *Exell* in J. Bot. 67, Suppl. Polypet. 1 : 189 (1929). A forest tree, to about 100 ft. high ; flowers green.
S.Nig.: Cross R., Ikom (Aug.) *Catterall* 41! *Mackay* 10! Also in Cabinda.

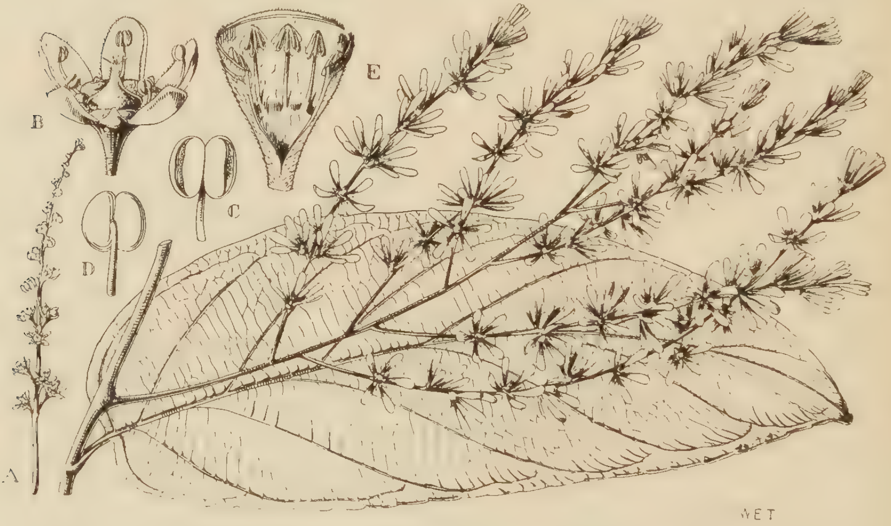

FIG. 76.—HOMALIUM LETESTUI *Pellegr.* (SAMYDACEAE).

A, branch of the inflorescence. B, flower. C, D, stamens, front and back. E, ovary partly laid open showing placentas with ovules at the top.

8. **H. aylmeri** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 166 (1927) ; Kew Bull. 1928 : 213. *H. sp. aff. aylmeri* of Aubrév. Fl. For. C. Iv. 3 : 20, t. 250. *H. alnifolium* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 166 (1927) and Kew Bull. 1928 : 212, partly, not of Thwaites & F. Muell. (1861). Medium-sized forest tree, to 90 ft. high ; flowers white ; slash and wood very hard.
S.L.: Pujehun (Feb.) *Lane-Poole* 141! Njala (Jan.) *Deighton* 2826! 2942! Kasewe (Jan.) *King* 156! **Iv.C.:** Abidjan *Aubrév.* 25! 31! Banco (Feb.) *Aubrév.* 890! **S.Nig.:** Sapoba (fr. Apr.) *Kennedy* 1082! 1670! *Onyeagocha* FHI 7129! Degema *Talbot* 3791! (See Appendix, p. 49.) [There appears to be a pubescent form of this species.]

9. **H. macropterum** *Gilg* in Engl. Bot. Jahrb. 40 : 489 (1908). Forest tree, to 50 ft. high ; wood very hard.
S.Nig.: Cross R., Ikom (fr. Sept.) *Catterall* 42! Also in Ubangi, French Cameroons and Cabinda.

10. **H. aubrevillei** *Keay* in Kew Bull. 1953 : 79. *H. longistylum* of Aubrév. Fl. For. C. Iv. 3 : 22, t. 251 (1936), not of Mast.
Iv.C.: Mt. Nimba (Mar.) *Aubrév.* 1130! Necaounié *Aubrév.* 1311!

11. **H. angustistipulatum** *Keay* l.c. 80 (1953).
G.C.: Essiama, *Fishlock* 12!

12. **H. molle** *Stapf* in J. Linn. Soc. 27 : 100 (1905) ; Gilg l.c. 493 ; Chev. Bot. 283 ; Aubrév. l.c. 3 : 18, t. 249. Spreading tree of swamp forest by streams, to 60 ft. high ; flowers white or very pale green.
Fr.G.: Boké (Mar.) *Pobéguin* 2013! Beyla (Feb.) *Chev.* 20856! Konanké (Feb.) *Chev.* 20834! Kindia *Jac.-Fel.* 83! **S.L.:** Bagroo R. (Apr.) *Mann* 881! Charlotte Falls (Mar.) *Dalz.* 925! York Pass (July) *Lane-Poole* 275! Port Loko (Apr.) *Sc. Elliot* 5866! **Lib.:** Sinoe Basin *Whyte*! Monrovia *Whyte*! Barclayville (Mar.) *Baldwin* 11129! **Iv.C.:** Makougnie (Jan.) *Chev.* 16167! Banco (May, Aug.) *Serv. For.* 1195! *Aubrév.* 1480! **G.C.:** Nkroful (Nov.) *Vigne* 1420! Essiama (Feb.) *Irvine* 2322! **S.Nig.:** Okomu F.R. (Feb.) *Brenan* 9087! Sapoba (Nov.) *Kennedy* 1780! *Keay* FHI 28078! Also in Gabon.

13. **H. africanum** (*Hook. f.*) *Benth.*—F.T.A. 2 : 497, partly ; Chev. Bot. 283. *Blackwellia africana* Hook. f. in Fl. Nigrit. 361 (1849). Forest tree in swamps and creeks, to 70 ft. high, flowers yellowish-green.
S.L.: *Don*! Pujehun (Mar., Apr.) *Aylmer* 22! *Deighton* 1657! Njala (Apr.) *Deighton* 2889! Limba (Apr.) *Sc. Elliot* 5572! **Lib.:** Grand Kola R. (Mar.) *Baldwin* 11211! **S.Nig.:** Lagos (Jan.) *Barter* 2165! *Dalz.* 1274! Atigere (fr. Feb.) *Millen* 146! Shasha F.R. (Apr., May) *Ross* 263! *Richards* 3321! Sapoba (May) *Kennedy* 1691! Calabar *Williams* 15! Oban *Talbot* 484! Also in French Cameroons.

14. **H. sarcopetalum** *Pierre* in Bull. Soc. Linn. Paris n.s. 1 : 119 (1899).
S.Nig.: Oban *Talbot* 1390! s.n.! **F.Po:** Ureka (Feb.) *Guinea* 2407! Also in French Cameroons, Gabon and Spanish Guinea.

Imperfectly known species.

1. **H. skirlii** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 579 (1921). Inadequately described ; no specimen cited.
Br.Cam.: Victoria.
2. **H.** sp. **A.** Forest tree, 50 ft. high ; flowers white, scented, in long spikes ; fruits unknown. Possibly near *H. macropterum* Gilg.
Fr.G.: Boké *Chillou* ! **G.C.:** Tano-Ofin F.R. (Jan.) *Vigne* 1006 !
3. **H.** sp. **B.** Forest tree, up to 4 ft. girth ; mature flowers and fruits unknown. Possibly near *H. aubrevillei* Keay.
S.Nig.: Ikom *Catterall* 66 !
4. **H.** sp. **C.** Small forest tree, up to 5 ft. girth ; fruits unknown.
S.Nig.: Ikom *Catterall* 69 !

3. BYRSANTHUS Guill.—F.T.A. 2 : 498.

Leaves lanceolate-elliptic to ovate-elliptic, obtuse or rounded at each end, 10–12 cm. long, 4–7 cm. broad, coriaceous, obscurely crenate, glabrous, shining, laxly reticulate on both surfaces ; lateral nerves 7–8 pairs, prominent on each side ; petiole 5–8 mm. long ; flowers paniculate ; rhachis with numerous clusters of small hairs ; calyx-lobes triangular, reflexed, about 2·5 mm. long, like the slightly larger petals covered with a short grey indumentum .. .. *brownii*

B. brownii *Guill.*—F.T.A. 2 : 499. *B. epigynus* Mast.—F.T.A. 2 : 499, partly. *Symmeria paniculata* of Sc. Elliot in J. Linn. Soc. 30 : 95, partly, not of Benth. Small tree or shrub in riverain forest, with rugose branches ; flowers fragrant.
Gam.: *Whitfield* ! Baraconda (Feb.–Mar.) *Heudelot* 335 ! **Fr.G.:** Kirita (June) *Maclaud* 296 ! Kittiar (May) *Pobéguin* 2078 ! Kissosso (July) *Pobéguin* 785 ! **S.L.:** Sellakuri, Little Scarcies R. (Mar.) *Sc. Elliot* 5074*b* ! Madina, Limba (Apr.) *Sc. Elliot* 5662 ! Pujehun (Apr.) *Aylmer* 65 ! Tonkoli, R. Taia *Dawe* 507 ! Njala (June) *Deighton* 1755 ! Messima, R. Waanje (Apr.) *Adames* 30 ! Tulimba, Gbenti Creek (Mar.) *Adames* 158 !

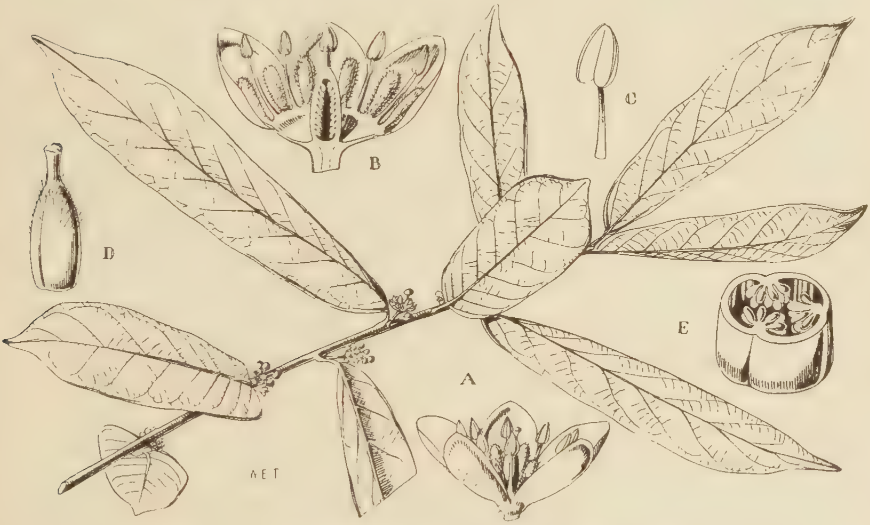

FIG. 77.—CASEARIA STIPITATA *Mast.* (SAMYDACEAE).

A, flower. B, the same opened out with vertical section of ovary. C, stamen. D, ovary. E, cross-section of ovary.

4. CASEARIA Jacq.—F.T.A. 2 : 493.

Flower-clusters shortly pedunculate ; branchlets shortly pubescent ; leaves oblong, rounded and slightly oblique at base, shortly acuminate, 10–16 cm. long, 3–6 cm. broad, slightly serrulate, slightly pubescent on the nerves when young ; lateral nerves about 10 pairs ; petiole about 5 mm. long ; sepals glabrous ; staminodes pubescent .. .. 1. *stipitata*

Flower-clusters sessile :

*Leaf-blade unequal-sided at base :

One half of leaf-blade inserted much lower than the other ; branches glabrous ; leaves oblong-lanceolate, acuminate, 10–12 cm. long, 3–3·5 cm. broad, crenate, glabrous ; lateral nerves about 7 pairs ; petiole 5–8 mm. long ; sepals glabrous ; staminodes villous .. .. 2. *inaequalis*

One half of leaf-blade not inserted above the other ; leaves obovate, cuneate on one side at base, shortly and abruptly acuminate at apex, 7–10 cm. long, 3·5–5·5 cm. broad ; lateral nerves about 6 pairs ; flowers not seen ; fruits oblong-ellipsoid, 4 cm. long, with the persistent reflexed calyx at the base .. 3. *dinklagei*

*Leaf-blade more or less equal-sided at base :

Flowers distinctly pedicellate ; sepals glabrous ; leaves oblong-elliptic to obovate-elliptic, rounded or shortly cuneate at the base, shortly acuminate, 9–18 cm. long, 3·5–7 cm. broad, with the lateral nerves prominent only beneath, the tertiary nerves numerous and subparallel beneath .. .. 4. *barteri*

Flowers nearly sessile ; sepals pubescent ; leaves obovate or obovate-elliptic, cuneate at base, very shortly and obtusely acuminate, 7–9 cm. long, 4–5 cm. broad, the lateral nerves prominent on both sides, the tertiary nerves few and laxly reticulate beneath .. .. 5. *bridelioides*

1. **C. stipitata** Mast.—F.T.A. 2 : 493. A tree, about 20 ft. high.
S.Nig.: Aboh *Barter* 322 !

2. **C. inaequalis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 168 (1927) ; Kew Bull. 1928 : 213 ; Aubrév. Fl. For. C. Iv. 3 : 22 ; Aubrév. Fl. For. Soud.-Guin. 74. A medium-sized tree, with yellow, ridged fruit.
S.L.: Bandajuma (May) *Aylmer* 73 ! **Lib.:** Mecca, Boporo (fr. Nov.) *Baldwin* 10430 ! **Iv.C.:** Tafiré *Aubrév.* 909 ! **S.Nig.:** Degema *Talbot* !

3. **C. dinklagei** *Gilg* in Engl. Bot. Jahrb. 40 : 511 (1908) ; Kennedy For. Fl. S. Nig. 34. *C. barteri* of Aubrév. l.c. 22, t. 252, not of Mast. Shrub or tree, to 60 ft. high, with yellow fleshy ridged fruit.
S.L.: York (fr. Dec.) *Deighton* 3340 ! **Lib.:** Dukwia R. (Apr.) *Cooper* 408 ! Grand Bassa (fr. May) *Dinklage* 1908. **Iv.C.:** Bingerville *Aubrév.* 1493 ! **S.Nig.:** Sapoba *Kennedy* 1578 ! [These specimens are only provisionally referred to this species, as the type has not been available for study.]

4. **C. barteri** *Mast.* in F.T.A. 2 : 494 (1871). *C. bule* Gilg l.c. 513. A shrub or tree, up to 50 ft. high ; mainly in swamp forest.
G.C.: Axim (fr. Feb.) *Irvine* 2272 ! (?). **S.Nig.:** Okomu F.R. (Jan.) *A. F. Ross* 243 ! Sapoba *Kennedy* 2044 ! Onitsha *Barter* 1635 ! Degema *Talbot* ! Oban *Talbot* 1630 ! **Br.Cam.:** Ambas Bay (Jan.) *Mann* 714 ! Johann-Albrechtshöhe (Jan.) *Staudt* 799 ! Victoria (Mar., May) *Winkler.* Also in French Cameroons and Gabon.

5. **C. bridelioides** *Mildbr. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 168 (1927) ; Kew Bull. 1928 : 213 ; Kennedy For. Fl. S. Nig. 34. A tall tree to 120 ft. high ; straight bole without buttresses, 60–80 ft. to first branch ; girth of mature trees 6–9 ft. ; in swamp forest ; flower pale green ; fruits orange.
G.C.: Ofin Headwaters F.R. (Oct.) *Vigne* 3122. **S.Nig.:** R. Oni *Sankey* 17 ! Akilla (fr. Apr., May) *Kennedy* 2002. Shasha F.R. (fl. & fr. Feb.–Apr.) *Richards* 3046 ! 3374 ! *Ross* 69 ! Also in French Cameroons.

56. FRANKENIACEAE

Herbs or shrublets ; leaves opposite, exstipulate, often small and ericoid. Flowers actinomorphic, hermaphrodite, solitary or cymose, small. Sepals 4–6, persistent, connate, induplicate-valvate. Petals as many as the sepals, free, clawed, with a scale-like appendage on the inside, imbricate. Stamens usually 6, hypogynous, free or shortly connate at the base ; anthers 2-celled, didymous, dehiscing longitudinally. Ovary superior, sessile, 1-celled, with 2–4 parietal placentas ; ovules numerous ; style simple, filiform. Capsule enclosed in the persistent calyx, opening by valves. Seeds with endosperm ; embryo straight, axile.

Widely dispersed on maritime shores.

FRANKENIA Linn.—F.T.A. 1 : 136.

Characters of the family.

Leaves flat, obovate to almost orbicular, petiolate, about 3–5 mm. long, setulose-pubescent ; flowers terminal ; calyx 3–4 mm. long .. .. *pulverulenta*

F. pulverulenta *Linn.*—F.T.A. 1 : 136 ; Guill. & Perr. Fl. Seneg. 40. A diffuse much-branched herb a few inches high, with opposite leaves, often covering the ground.
Sen.: *Sieber* 16 ! Sor Isl. (Oct.–Dec.) *Perrottet* ! Also at M'bidjem and Dakar. Maritime shores of the warmer parts of the Old World.

57. TAMARICACEAE

Shrubs or trees, with slender branches and small scale-like alternate leaves ; stipules absent. Flowers very small, actinomorphic, usually hermaphrodite, in slender catkin-like spikes or racemes. Sepals 4–6, imbricate, free. Petals as many as the sepals, free. Disk present. Stamens hypogynous, 5–10, free or connate at the base ; anthers 2-celled, opening by longitudinal slits. Ovary superior, 1-celled, with parietal or basal placentas ; styles 3–4, free or united at the base ; ovules numerous, ascending. Fruit a capsule. Seeds with or without endosperm, with a tuft of hairs at the apex or all round ; embryo straight.

Temperate regions of Europe, N. Africa and Asia ; mostly maritime shores. Recognized by the scale-like leaves, minute flowers, definite stamens, disk, and the parietal or basal placentation.

TAMARIX Linn.—F.T.A. 1 : 151.

Stamens free or connate at the very base ; anthers extrorse. Seeds with a crest of long hairs at the apex.

A shrub or small tree ; branchlets slender ; leaves alternate, ovate-triangular, very acute, about 2 mm. long, distinctly gland-dotted, otherwise glabrous ; flowers very small in slender catkin-like racemes ; bracts shorter than the flowers *senegalensis*

T. senegalensis *DC.* Prod. 3 : 96 (1828) ; Niedenzu in E. & P. Pflanzenfam. 21 : 287 (1925). *T. gallica* of F.T.A. 1 : 151, not of Linn. ; Chev. Bot. 49 ; Aubrév. Fl. For. Soud.-Guin. 76, t. 11. A twiggy shrub or small tree, of maritime and dry inland sandy situations.
Sen.: M'bidjem *Thierry* 28! Sor Isl. *Brunner*! **Lib.:** Santa Maria (Oct.) *Dinklage* 3180! **Fr.Nig.:** Manga *fide* Aubrév. *l.c.* **N.Nig.:** Bornu *Kerr*! Also in Cape Verde Islands, Mauritania, Central Sahara and N.E. Africa.

58. PASSIFLORACEAE [1]

Herbaceous climbers bearing tendrils, or erect trees or shrubs. Leaves alternate, entire or lobed, often with a glandular petiole ; stipules usually small and deciduous. Flowers hermaphrodite or unisexual. Sepals 5, imbricate, persistent, free or partially united. Petals 5, rarely absent, free or shortly united, imbricate. Corona of one or more rows of thread-like processes or scales, or annular. Stamens 5 or more, hypogynous or perigynous, shortly united or in bundles, sometimes springing from the gynophore ; anthers 2-celled, opening lengthwise. Ovary superior, 1-celled, with 3 or rarely 4–5 parietal placentas ; ovules usually numerous ; styles free or united ; stigmas often capitate. Fruit a capsule or berry, indehiscent or loculicidally 3-valved. Seeds with pitted testa, surrounded by a pulpy aril ; endosperm fleshy ; embryo large, straight.

Almost exclusively tropical and subtropical. Recognized by the usually climbing habit (the African representatives, however, are mainly trees and shrubs), alternate stipulate leaves often with a pair of glands at the base, the flowers provided with a corona, the superior 1-celled ovary with parietal placentas, and pitted seeds.

Flowers hermaphrodite ; corona conspicuous :
  Styles free to the base or nearly so :
    Tendrils present ; stamens 4–5, filaments partly adnate to a long gynophore ; fruit stipitate ; climber .. .. **1. Passiflora**
    Tendrils absent ; trees or shrubs :
      Stamens numerous ; flowers large and conspicuous, axillary **2. Smeathmannia**
      Stamens 5 ; flowers rather small :
        Flowers solitary or fasciculate in the leaf-axils or from the axils of the fallen leaves ; leaves not glandular at the base.. .. .. **3. Paropsia**
        Flowers in terminal panicles ; leaves with a pair of large glands at the base **4. Androsiphonia**
  Styles united ; stigma capitate :
    Fertile stamens numerous ; flowers sessile, surrounded by numerous imbricate bracts ; no tendrils .. .. **5. Barteria**
    Fertile stamens 5, inserted on a gynophore ; flowers pedicellate, not conspicuously bracteate ; tendrils present.. .. .. **6. Crossostemma**
Flowers unisexual ; corona small and inconspicuous ; tendrils present ; leaves glandular at the base .. .. **7. Adenia**

1. PASSIFLORA Linn.—Benth. & Hook. f. Gen. Pl. 1 : 810.

A slender twiner with softly hispid branches ; leaves digitately trilobed, widely cordate at base, acute at apex of the lobes, 5–10 cm. long and broad, thin, ciliate ; tendrils axillary, not branched ; flowers axillary, solitary, about 5 cm. in diam. ; pedicel usually a little longer than the often ciliate petiole ; bracts pinnatisect, with numerous gland-tipped cilia, about 2 cm. long, at length larger in fruit ; petals white ; corona multistriate, bluish-purple ; fruit ovoid, up to 4 cm. long, glabrous, surrounded by the persistent calyx .. .. *foetida*

P. foetida *Linn.*—F.T.A. 2 : 520 ; Chev. Bot. 284. Rank-scented ; fruit yellow when ripe, edible.
Sen.: Dakar (May) *Baldwin* 5748! **Gam.:** *Ingram*! **Fr.G.:** Conakry (Feb.) *Chev.* 12124! **S.L.:** Samu (Dec.) *Sc. Elliot* 4084! Njala (Feb.) *Deighton* 1931! Kenema (Nov.) *Deighton* 412! Ronietta (fr. Nov.) *Thomas* 5513! **Lib.:** Sinoe Basin *Whyte*! Dukwia R. (fl. & fr. Oct., Nov.) *Cooper* 12! Ganta *Harley*! **Iv.C.:** Prolo (Aug.) *Chev.* 19874. **G.C.:** Cape Coast *Cummins* 22! Accra Plains (Apr.–Aug.) *Brown* 331! *Bally* 17! Ajena, R. Volta (Mar.) *A. S. Thomas* 159! Prampram (Jan.) *N. F. Robertson* 46! **N.Nig.:** Jebba (Dec.) *Hagerup* 676! **S.Nig.:** Lagos *MacGregor* 346! Ibadan (fl. & fr. Sept.) *Latilo* FHI 21014! Eket *Talbot* 3084! **Br.Cam.:** Victoria (Feb.) *Maitland* 400! **F.Po:** (June) *Mann* 420! A native of tropical America, naturalized in waste places. (See Appendix, p. 51.)

Besides the above, *P. edulis* Sims, *P. laurifolia* Linn. and *P. quadrangularis* Linn., natives of tropical America, are cultivated for their fruits.

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[1] The genus *Soyauxia* Oliv., previously included in this family, will be dealt with in the present edition (Vol. I, Part 2) under the *Medusandraceae.*

2. SMEATHMANNIA Soland. ex R.Br.—F.T.A. 2 : 506.

Ovary villose ; persistent calyx as long or longer than the fruit ; branches more or less tomentose ; leaves pubescent beneath, broadly elliptic to obovate, rounded at base, rounded and shortly acuminate at apex, 6–20 cm. (usually about 8 cm.) long, 4–7 cm. broad, undulately glandular-toothed .. .. 1. *pubescens*

Ovary glabrous ; persistent calyx much shorter than the fruit ; branches and leaves glabrous or nearly so :

Leaves cuneate at base, obovate- to oblong-elliptic, very acutely acuminate, 7–12 cm. long, 3–5 cm. broad .. .. 2. *laevigata* var. *laevigata*

Leaves rounded at base, oblong-elliptic, shortly acuminate, 7–15 cm. long, 4–6 cm. broad .. .. 2a. *laevigata* var. *nigerica*

1. **S. pubescens** *Soland. ex R.Br.*—F.T.A. 2 : 506 ; Chev. Bot. 285, incl. vars. *cordifolia* and *parviflora* ; Aubrév. Fl. For. C. Iv. 3 : 29, t. 254. *S. rosea* and *S. emarginata*, both of Lemaire. A shrub or small tree, to 30 ft. high ; flowers white, fragrant ; fruit white or reddish, crustaceous.
Fr.G.: *Scaëtta* 3307 ! **S.L.:** *Whitfield* ! *Smeathmann* ! R. Bagroo (Apr.) *Mann* 867 ! Kambia, R. Scarcies (Jan.) *Sc. Elliot* 4387*a* ! Njala (Sept.) *Deighton* 74 ! Yetaya (Sept.) *Thomas* 2283 ! 2436 ! **Lib.:** Kakatown *Whyte* ! Dukwia R. (May–Oct.) *Cooper* 442 ! *Linder* 97 ! Zorzor (Mar.) *Bequaert* 146 ! **Iv.C.:** Rasso *Aubrév.* 145 ! **G.C.:** R. Tano (Sept.) *Chipp* 338 ! 378 ! Cape Coast *Brass* ! Axim (Dec.) *Johnson* 888 ! Ejura (Aug.) *Chipp* 758 ! **S.Nig.:** Lagos (Dec.) *Millen* 71 ! 116 ! Abeokuta *Irving* ! Onitsha *Barter* 201 ! Degema *Talbot* 3615 ! Also in French Cameroons and Ubangi-Shari-Chad. (See Appendix, p. 51.)

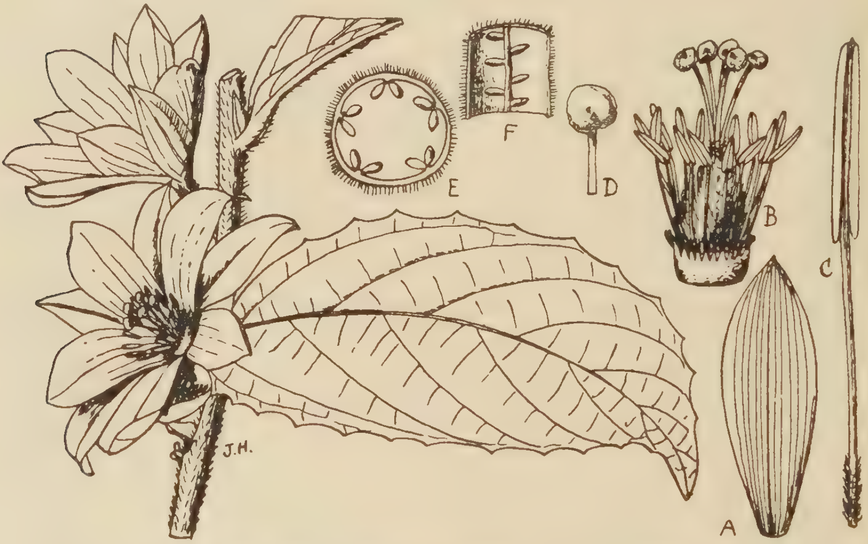

FIG. 78.—SMEATHMANNIA PUBESCENS *Soland. ex R.Br.* (PASSIFLORACEAE).

A, petal. B, stamens and pistil, with surrounding corona. C, stamen. D, stigma. E, cross-section of ovary. F, part of ovary from within showing parietal placenta and ovules. Partly after Bot. Mag.

2. **S. laevigata** *Soland. ex R.Br.* var. **laevigata**—F.T.A. 2 : 507 ; Chev. Bot. 284 ; Aubrév. l.c. A shrub to 9 ft. high ; often by rivers ; flowers smaller than in the preceding.
Gam.: *Garrett* ! *Whitfield* ! **Sen.:** *Perrottet* 345 ! **Fr.G.:** Rio Nunez *Heudelot* ! Conakry (Jan.) *Dalz.* 8139 ! Upper Niger (Apr.) *Chev.* 13336 ! **S.L.:** *Afzelius* ! *T. Vogel* 149 ! Freetown (Oct., Jan.) *Johnston* 45 ! *Dalz.* 8140 ! Regent (Dec.) *Sc. Elliot* 3912 ! Scarcies R. (Jan.) *Sc. Elliot* 4414 ! Bagroo R. (Mar.) *Mann* 791 ! Magbile (Dec.) *Thomas* 5876 ! Mange, Bure (Feb.) *Deighton* 4977 ! **Lib.:** Monrovia (June) *Baldwin* 5912 ! *Whyte* ! Duport (Nov.) *Linder* 1505 ! 1507 !

2a. **S. laevigata** var. **nigerica** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 171 (1927) ; Chev. Bot. 285. A shrub or tree up to about 30 ft. high ; flowers white ; fruit ivory-white.
Sen.: Sedhiou (Feb.) *Chev.* 2999. **Fr.Sud.:** Sangarala (Feb.) *Chev.* 345 ! **Fr.G.:** *Pobéguin* 222 ! Kankan (Mar.) *Chev.* 568. Kouroussa *Chev.* 15713. **S.L.:** Kenema (June) *Aylmer* 87 !

It seems very probable that this variety is only one of the results of hybridization between the two species, as suggested from a study of numerous specimens collected in Sierra Leone by *Thomas* (Nos. 7098 and 7022). Another combination of characters is also shown by *Thomas'* specimens (Nos. 5064, etc.), which have the narrow-based leaves of typical *S. laevigata* and the villous ovary of *S. pubescens*.

3. PAROPSIA Noronha—F.T.A. 2 : 505.

Branches rusty-pubescent ; leaves oblong-elliptic, rounded or slightly cuneate at base, acuminate, 5–16 cm. long, 2–6 cm. broad, repand-dentate, thin, pubescent on the nerves, finely reticulate ; flowers fasciculate on long inflorescences ; pedicels densely pilose, about 8 mm. long ; sepals spathulate-oblanceolate, subobtuse, about 1 cm. long ; petals slightly longer than the sepals, glabrous .. .. *guineensis*

P. guineensis *Oliv.*—F.T.A. 2 : 505. *P. pritzelii* Gilg in Engl. Bot. Jahrb. 40 : 471 (1908). Tree, to 60 ft. high and 5 ft. girth ; flowering when leafless, or nearly so.
S.Nig.: Olokemeji F.R. (Mar.) *A. F. Ross* 105 ! Okomu F.R. (fl. Mar., fr. May) *A. F. Ross* 194 ! Sapoba *Kennedy* 2345 ! 2127 ! Calabar *Thomson* 31 ! Oban *Talbot* 1623 ! Also in French Cameroons, Cabinda and Uganda.

4. ANDROSIPHONIA Stapf in J. Linn. Soc. 37 : 101 (1905).

A shrub ; leaves oblong-elliptic, acuminate, subacute and often with two large black glands on each side at the base, 12–25 cm. long, 4–7 cm. broad, denticulate, slightly puberulous when young, distinctly reticulate on both surfaces ; lateral nerves about 6–8 pairs ; flowers greyish-green in a terminal panicle ; bracts leafy, conspicuously glandular ; sepals tomentellous ; petals about the same length *adenostegia*

A. adenostegia *Stapf* in J. Linn. Soc. 37 : 101 (1905) ; Chev. Bot. 288. A shrub or small tree, to 12 ft. high ; flowers greyish-green ; fruits orange when ripe.
S.L.: Guma (Jan.) *Smythe* 216 ! Jombohun (Jan.) *Deighton* 3882 ! Faiama (fl. & fr. Jan.) *Deighton* 3867 ! 3868 ! Gola Forest (Dec.) *King* 95*b* ! **Lib.:** Monrovia *Whyte* ! Kakatown *Whyte* ! Dukwia R. (fl. & fr. Feb., Mar.) *Cooper* 211 ! 276 ! Little Kola R. (fr. Mar.) *Baldwin* 11185 ! Piatah, Salala (Dec.) *Baldwin* 10596 ! Boporo Dist. (fl. & fr. Dec.) *Baldwin* 10624 ! 10704 ! 10830 ! **Iv.C.:** Haut-Nuon (Apr.) *Chev.* 21194.

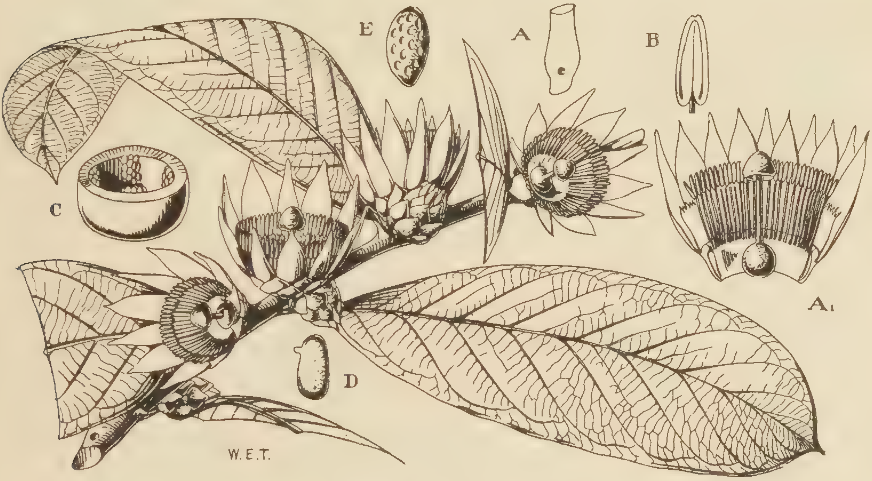

Fig. 79.—Barteria nigritiana *Hook. f.* (Passifloraceae).

A, hollow branchlet with opening made by ants. A1, flower laid open. B, anther. C, cross-section of ovary. D, ovules. E, seed.

5. BARTERIA Hook. f.—F.T.A. 2 : 510.

Flowers solitary or up to 3 in the leaf-axils and inserted approximately at the same level ; bracts acute ; branchlets solid except for hollow spindle-shaped swellings here and there ; leaves spirally arranged, oblanceolate to oblong, 10–22 cm. long, 4–8 cm. broad, with a narrow petiole .. .. 1. *nigritiana*

Flowers 4 or more arranged in the form of a long horseshoe on the stem around the base of the decurrent leaf ; bracts rounded at apex ; branchlets hollow throughout and cylindrical ; leaves distichous, oblong or slightly obovate-oblong, 20–42 cm. long, 6–19 cm. broad, with a very broad petiole and decurrent lamina.. 2. *fistulosa*

1. **B. nigritiana** *Hook. f.*—F.T.A. 2 : 510. *B. braunii* Engl. (1892). A tree, 10–20 ft. high, rarely to 45 ft. ; branchlets with spindle-shaped swellings occupied by stinging ants ; flowers white, sweet-scented, with a large mushroom-shaped yellow stigma ; fruit ovoid, yellowish, with compressed pitted seeds. Often found in the coastal districts.
S.Nig.: Lagos (Jan.–Mar.) *Dalz.* 1061 ! Akassa *Barter* 2119 ! R. Bonny (Oct.) *Mann* 507 ! Udi (Mar.) *Kitson* ! Enugu (Feb.) *Jones* FHI 654 ! Agulu *Thomas* 152 ! Oban *Talbot* ! Calabar *Thomson* 32 ! **F.Po:** Bokoko *Mildbr.* 6838. Also in French Cameroons, Spanish Guinea, Gabon and Cabinda. (See Appendix, p. 50.)

2. **B. fistulosa** *Mast.* in F.T.A. 2 : 511 (1871). A tree to 40 ft. high, in gaps in rain forest ; branches becoming hollow and cylindrical, inhabited by large stinging ants.
S.Nig.: Okomu F.R. *Ross* 127 ! Benin (May) *Baldwin* 12011 ! *Kennedy* 223 ! 2171 ! Oban *Talbot* 471 ! **Br.Cam.:** Victoria (Apr.) *Maitland* 616 ! Johann-Albrechtshöhe *Staudt* 9451 ! Barombi (Feb.) *Preuss* 31 ! **F.Po:** *Mann* 268 ! Also in French Cameroons, Gabon and Belgian Congo.

Maitland 1578 from Ekwe-ngong and *Ujor* FHI 30375 from Bali, both in Bamenda, British Cameroons, may represent a new species, but more and better material is required.

6. **CROSSOSTEMMA** Benth.—F.T.A. 2 : 511.

Climber ; branchlets glabrous ; leaves oblong-elliptic, obtuse or slightly cuneate at base, acutely acuminate, 7–11 cm. long, 3–5 cm. broad, strongly reticulate on both surfaces ; lateral nerves much-branched, about 5 pairs ; tendrils axillary with the few-flowered inflorescence ; pedicels jointed in the middle ; flowers yellow ; sepals and petals subequal, closely marked with darker spots, about 1 cm. long ; fruit ellipsoid, acute at each end, 6-sided, about 8 cm. long, valves boat-shaped with the placentas down the middle ; seeds ovate, smooth, about 1 cm. long *laurifolium*

C. **laurifolium** *Planch. ex Benth.*—F.T.A. 2 : 511 ; Chev. Bot. 285. Forest climber, with white flowers and yellow or orange fruits.
Fr.G.: *fide* Chev. *l.c.* **S.L.:** Rotomba Isl. (Mar.) *Kirk* 13 ! Kambui Hills *Lane-Poole* 461 ! Mamaha (Nov.) *Thomas* 4381 ! Makali (fr. Feb.) *Deighton* 4078 ! **Lib.:** Dukwia R. *Cooper* 161 ! Zigida, Vonjama (fr. Oct.) *Baldwin* 10014 ! Mecca, Boporo (Nov.) *Baldwin* 10410 ! Sanokwele Dist. (fr. Sept.) *Baldwin* 9302 ! 9374 ! 9466 ! Belefanai, Gbanga (fr. Dec.) *Baldwin* 10546 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Axim *Burton & Cameron* ! Atuna, Ashanti *Vigne* 3503 ! Pamu-Berekum F.R. *Vigne* 2492 ! Cape Coast *Brass* !

7. **ADENIA** Forsk.—F.T.A. 2 : 512, as *Modecca* Lam. and *Ophiocaulon* Hook. f.

Leaves with a pair of separate glands at the top of the petiole ; sepals united about half-way up :

Peduncles very short, not more than 0·5 cm. long :

Leaves oblong or oblong-elliptic, subacute at base, acute at apex, 6–8 cm. long, 2·5–4 cm. broad, entire, laxly reticulate beneath, glabrous ; petiole biglandular at the top, up to 1·5 cm. long ; male flowers about 2 cm. long .. 1. *tenuispira*

Leaves widely cordate at base ; other characters as below .. .. 4. *lobata*

Peduncles longer, over 2 cm. long :

Leaves acute to rounded at base :

Pedicels articulated about half-way up ; male flowers about 1·5 cm. long ; leaves oblong or ovate-oblong, acutely acuminate, subobtuse at base, 8–10 cm. long, 3·5–4·5 cm. broad, entire, glabrous, laxly venose ; petiole 1·5–2 cm. long, biglandular at the top .. .. 2. *oblongifolia*

Pedicels articulated nearly at the apex ; male flowers about 1 cm. long ; leaves ovate to ovate-elliptic, rounded at base, gradually acuminate, 10–13 cm. long, 4–6 cm. broad, entire, glabrous, very laxly venose ; petiole 1·5–2 cm. long, with two large glands at the top .. .. 3. *mannii*

Leaves widely cordate or truncate at base, entire or repand-lobate, rarely deeply lobed, ovate, acuminate, 10–15 cm. long, 6–10 cm. broad, thin, glabrous, sub-5-nerved from the base ; stems tuberculate ; petiole half the length of the leaf, with 2 broad semilunar fleshy glands at the top ; male flowers about 1·5–2·5 cm. long ; calyx campanulate, lobes lanceolate, acute ; petals laciniate .. .. 4. *lobata*

Leaves with the glands at the apex of the petiole consolidated and forming a peltate base ; sepals united about half-way up :

Inflorescence long-pedunculate ; leaves 3-lobed to beyond the middle, 10–13 cm. long, glabrous, membranous, 5-nerved from the base ; petiole 4–6 cm. long ; peduncle 15 cm. long or more ; male flowers about 2 cm. long ; petals linear 5. *aspidophylla*

Inflorescence sessile ; leaves 3–5-lobed to about the middle, thin, lobes rounded at the apex, glabrous, glaucous, about 5–8 cm. long ; petiole about as long as the leaf, the glands at the apex connate and forming the peltate base ; male flowers shortly pedicellate, 5 cm. long ; female much shorter with linear calyx-lobes ; fruits ellipsoid, 3–4 cm. long, distinctly nerved .. .. 6. *venenata*

Leaves with a single often spathulate gland at the top of the petiole ; sepals free to the base or at most united for one third their length :

Leaves ovate-oblong, acutely acuminate, much longer than broad, slightly cordate at base, 5–9 cm. long, 2·5–4·5 cm. broad, glabrous, conspicuously black-spotted on the upper surface ; male sepals free to the base, with small fleshy warts on the outside .. .. 7. *cynanchifolia*

Leaves very broadly ovate, truncate or widely cordate at base, about as broad or broader than long :

Sepals free to the base ; leaves conspicuously spotted :

Inflorescence several-flowered, with a fairly long peduncle ; leaves more or less rhomboid, averaging about 7 cm. broad, entire or slightly lobed ; capsule 6-angled, ovoid, 2 cm. long ; seeds black, coarsely pitted .. 8. *cissampeloides*

Inflorescence few-flowered and shortly pedunculate ; leaves small, averaging about 4 cm. broad, mostly repand-lobate .. .. 9. *gracilis*

Sepals connate for one third ; leaves broadly ovate, widely and shallowly cordate, obtusely and shortly acuminate, 6–10 cm. long, 5·5–9 cm. broad, entire, minutely dotted on the upper surface when young, otherwise glabrous .. 10. *dinklagei*

1. A. **tenuispira** (*Stapf*) *Engl.* Pflanzenw. Afr. 3, 2 : 603 (1921) ; Hutch. & Dalz. in Kew Bull. 1928 : 214. *Modecca tenuispira* Stapf in J. Linn. Soc. 37 : 102 (1905). *M. nigricans* of Chev. Bot. 287. A dioecious glabrous climber with long fine tendrils and greenish flowers.
Lib.: *Cook* 346. Sinoe Basin *Whyte* ! **Iv.C.:** Bouroukrou (Jan.) *Chev.* 17002. Aboisso (Mar.) *Chev.* 17812. **G.C.:** Assuantsi (Mar.) *Irvine* 1576 !

2. **A. oblongifolia** *Harms* in Engl. Bot. Jahrb. 26 : 236 (1899). A slender glabrous twiner.
   Br.Cam.: Johann-Albrechtshöhe (Feb.) *Staudt* 621. Also in French Cameroons.
3. **A. mannii** (*Mast.*) *Engl.* Bot. Jahrb. 14 : 375 (1891). *Modecca mannii* Mast. in F.T.A. 2 : 516 (1871) ; Chev. Bot. 286. A glabrous climber, with pale green flowers.
   S.L.: Peri, Gaura (Oct.) *Deighton* 5241 ! **Iv.C.:** Lower Cavally (Aug.) *Chev.* 19860. Upper Cavally (Apr.) *Chev.* 21347. **S.Nig.:** Oban *Talbot* ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 17 !
4. **A. lobata** (*Jacq.*) *Engl.* l.c. (1891). *Modecca lobata* Jacq.—F.T.A. 2 : 516 ; Chev. Bot. 286. *M. caricifolia* and *M. incisa* of Chev. Bot. 286. *Kolbia elegans* P. Beauv. Fl. Owar. 2 : 91, t. 120. A tall woody climber, the older stems sometimes an inch or more in diameter and tubercled ; leaves variable in shape ; flowers greenish-yellow, sweet-scented ; fruits yellow.
   Sen.: Carabane (Jan.) *Chev.* 3000. **Fr.G.:** Labé (Apr.) *Chev.* 12290. Diaguissa (Mar.) *Chev.* 12642. **S.L.:** Bagroo R. (Apr.) *Mann* 837 ! Falaba (Mar.) *Sc. Elliot* 4463 ! Njala (July, Aug.) *Deighton* 770 ! 1827 ! Rokupr (Sept.) *Jordan* 355 ! Matotoka (July) *Thomas* 1268 ! **Lib.:** Monrovia *Whyte* ! Grand Bassa (July) *T. Vogel* 115 ! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Aininam, Obuasi (fr. Nov.) *Chipp* 590 ! Aburi Road (Feb.) *Dalz.* 8259 ! Accra Plains (Feb.) *Johnson* 608 ! **Dah.:** several localities *fide* Chev. *l.c.* **N.Nig.:** Jebba *Barter* 1308 ! **S.Nig.:** Lagos *Rowland* ! Oban *Talbot* 1619 ! Calabar *Thomson* 92 ! **Br.Cam.:** Victoria (Apr.) *Maitland* 618 ! Banga, Kumba (Apr.) *Ejiofor* FHI 29337 ! **F.Po:** *Mann.* Also in Principe, S. Tomé and Annobon Islands, and from French Cameroons to Angola. (See Appendix, p. 50.)
5. **A. aspidophylla** *Harms* in Engl. Bot. Jahrb. 26 : 235 (1899). A glabrous climber.
   Br.Cam.: Johann-Albrechtshöhe (Mar.) *Staudt* 884.
6. **A. venenata** *Forsk.* Fl. Aegypt.-Arab. 77 (1775). *Modecca abyssinica* Hochst.—F.T.A. 2 : 514. A sub-arborescent climber, twining, with glabrous glaucous stems.
   N.Nig.: near Verre Hills, Yola (Feb.) *Dalz.* 190 ! Also in Eastern Sudan and Abyssinia.

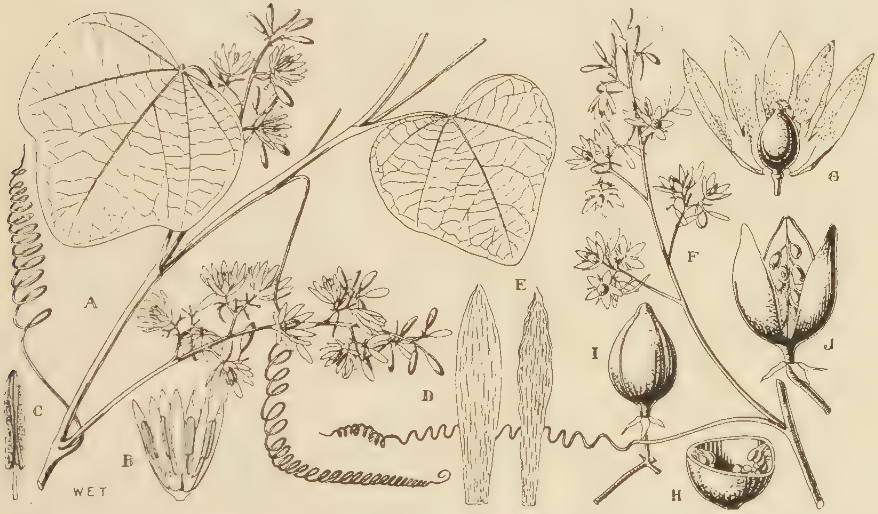

FIG 80.—ADENIA CISSAMPELOIDES (*Planch. ex Benth.*) *Harms* (PASSIFLORACEAE).

A, branch with male inflorescence and leaves. B, male flower opened out. C, stamen. D, E, sepal and petal of male flower. F, female inflorescence. G, female flower laid open. H, cross-section of ovary. I, fruit. J, fruit, open.

7. **A. cynanchifolia** (*Benth.*) *Harms* in E. & P. Pflanzenfam. Nachtr. 255 (1897). *Modecca cynanchifolia* Benth. in Fl. Nigrit. 366 (1849). *Ophiocaulon cynanchifolius* (Benth.) Mast. in F.T.A. 2 : 519. A climber with slender, terete branches.
   F.Po: (Nov.) *T. Vogel* 196 !
8. **A. cissampeloides** (*Planch. ex Benth.*) *Harms* l.c. 255 (1897). *Modecca cissampeloides* Planch. ex Benth. in Fl. Nigrit. 365 (1849). *Ophiocaulon cissampeloides* (Planch. ex Benth.) Mast. in F.T.A. 2 : 518. *O. tropaeoloides* of Chev. Bot. 287. *O. rowlandii* Bak. (1895). A climber, with terete ashen branches ; leaves often marbled above, pale beneath ; petals greenish-yellow ; common in forest regrowth and margins.
   Fr.G.: Fouta Djalon (Apr.) *Chev.* 12903. Timbo (May) *Chev.* 13603. **S.L.:** Freetown (Aug.) *Sc. Elliot* 5921 ! *Deighton* 2050 ! Falaba (Mar.) *Sc. Elliot* 5420 ! Jigaya (fr. Sept.) *Thomas* 2695 ! Musaia (Apr.) *Deighton* 5376 ! **Lib.:** Peahtah (Oct.) *Linder* 1074 ! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Sefwi-Bekwai (fl. & fr. Aug.) *Vigne* 1315 ! Obuasi (fr. Nov.) *Chipp* 588 ! Bunsu, Tafo (May) *N. F. Robertson* 117 ! **N.Nig.:** Nupe *Barter* 1663 ! Anara F.R. (May) *Keay* FHI 22969 ! Abinsi *Dalz.* 737 ! **S.Nig.:** Lagos *Millen* 33 ! Abeokuta *Rowland* ! R. Nun *Mann* 497 ! **Br.Cam.:** Buea (fr. May) *Maitland* 679 ! **F.Po:** *T. Vogel* 162 ! *Mann* 413 ! Extends to Spanish Guinea and Central Africa. (See Appendix, p. 50.)
9. **A. gracilis** *Harms* in Engl. Bot. Jahrb. 26 : 236 (1899). A climber of the same habit as the preceding, with smaller flowers and leaves.
   S.L.: Bo (fr. Jan.) *Thomas* 7457 ! **Lib.:** Gbanga (Sept.) *Linder* 546 ! Gbau, Sanokwele (Sept.) *Baldwin* 9441 ! Mecca, Boporo (Nov.) *Baldwin* 10421 ! **G.C.:** R. Ancobra, Axim (Feb.) *Irvine* 2149 ! **S.Nig.:** Oban *Talbot* 469 ! **Br.Cam.:** Buea (Jan.) *Maitland* 228 !
10. **A. dinklagei** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 174 (1927) ; Kew Bull. 1928 : 214. A climber with white stems.
    Lib.: *Cook* 170. Grand Bassa *Dinklage* 2109 !

Imperfectly known species.

A. triloba *Engl.* Pflanzenw. Afr. 3, 2 : 602 (1925). Description inadequate ; no specimen cited.
Togo: Siafi Mt.

59. CUCURBITACEAE

Herbs or rarely undershrubs with watery juice, often scabrid; stems scandent or prostrate; tendrils mostly present, spirally coiled. Flowers monoecious or dioecious, very rarely hermaphrodite, actinomorphic. Male flower: calyx tubular, lobes imbricate or open; corolla polypetalous or gamopetalous, lobes imbricate or induplicate-valvate; stamens free or variously united, mostly 3, rarely 1–5, one anther always 1-celled, the others 2-celled, cells straight or often curved, flexuous or conduplicate, connective often produced. Female flower: calyx-tube adnate to the ovary and often produced beyond it; staminodes usually not present; ovary inferior or very rarely free; placentas often 3, parietal but often meeting in the middle; ovules numerous, rarely few, arranged towards the walls of the ovary; style simple or rarely 3 free styles; stigmas thick. Seeds various, often flattened, without endosperm.

Mainly a tropical family of scandent habit and often with spirally coiled tendrils; flowers always unisexual; anthers often twisted; ovary inferior, with parietal placentas.

Petiole with a pair of glands on each side at the top, or on each side of the decurrent leaf-base:
 Ovary 1-celled with intrusive placentas; fruit much exceeding 5 cm. long; petals free; glands on the petiole:
  Dioecious; male flowers racemose, female solitary; petals entire; fruits globose or oblong-ellipsoid, up to about 12 cm. long .. .. .. 1. **Adenopus**
  Monoecious; male and female flowers solitary; petals denticulate; fruits large, of variable shape .. .. 2. **Lagenaria**
 Ovary 3–4-celled with axile placentas; fruit ellipsoid, up to 1·5 cm. long; petals united; glands on the decurrent base of the leaf .. .. .. 3. **Cayaponia**
Petiole without glands at the top:
 Petals free:
  Tendrils simple; leaves digitately lobed; male inflorescence racemose or subfasciculate; petals linear or filiform; anthers longitudinally conduplicate; root tuberous 4. **Trochomeria**
  Tendrils branched; petals not linear; male flowers racemose:
   Petals covered by the calyx in bud; fruit dry when ripe, with a fibrous endocarp containing the seeds .. .. 5. **Luffa**
   Petals exposed in bud:
    Receptacle tubular, about 1·5 cm. long; petals obovate about 2 cm. long, much overlapping in bud; leaves coriaceous .. .. 6. **Cogniauxia**
    Receptacle patelliform, very short; petals oblong, up to 8 mm. long; leaves membranous:
     Anther cells conduplicate, connective not produced; leaves usually lobed, 10–25 cm. long and broad .. .. 7. **Bambekea**
     Anther cells straight, connective produced to form a spur; leaves entire, up to about 12 cm. long and 9 cm. broad .. .. 8. **Gerrardanthus**
 Petals united in the lower part:
  Anthers straight or curved, not flexuous:
   Bract foliaceous and fimbriate at the base of the inflorescence in the axils of the leaves, resembling a stipule; leaves deeply lobed nearly to the base; tendrils simple; male flowers few on a common peduncle, female solitary; fruit small, few seeded .. .. 9. **Ctenolepis**
   Bracts minute or absent:
    Style inserted on an annular or cup-shaped disk; anthers often sessile; fruits usually not beaked (not known in *Oreosyce*):
     Connective of anther mostly produced at the apex; filaments distinct or anthers subsessile; receptacle shortly campanulate .. .. .. 10. **Melothria**
     Connective not produced; anthers sessile; receptacle tubular 11. **Oreosyce**
    Style without a disk at the base; connective of anther produced at the apex; anthers not sessile; fruit beaked .. .. 12. **Kedrostis**
  Anther cells flexuous or conduplicate:
   Calyx and pedicels of male flowers broadly winged; petiole with a large leathery gland within the base; female sepals linear-spathulate, abruptly reflexed over the top of the fruit .. .. 13. **Dimorphochlamys**
   Calyx and pedicels not winged; gland rarely present within the base of the petiole:
    Corolla segments pectinate; fruit large with several very prominent ribs; seeds large and thick; leaves divided to the base; tendrils branched; flowers dioecious .. .. 14. **Telfairia**
    Corolla segments entire or at most dentate; fruit not or scarcely ribbed:

Filaments free, or anthers sessile :

Male receptacle with 2–3 incurved scales inside ; peduncles often with large foliaceous bracts, connective not produced at the apex .. 15. **Momordica**

Male receptacle without scales inside :

Corolla lobed nearly to the base :

Connective of anthers produced at the apex ; anthers on free filaments ; tendrils simple .. .. 16. **Cucumis**

Connective of anthers not produced :

Leaves deeply pinnately partite or pinnatifid ; tendrils branched ; flowers monoecious ; male receptacle short, widely campanulate 17. **Colocynthis**

Leaves digitately or palmately lobed, or entire :

Anthers free :

Filaments very short, anthers subsessile in the campanulate receptacle ; male flowers clustered at the apex of a common peduncle, the female solitary in the same axil ; tendrils simple .. 18. **Cucumeropsis**

Filaments well developed :

Dioecious ; male flowers in racemes, female solitary ; tendrils simple 19. **Physedra**

Monoecious ; male and female flowers fasciculate in the leaf axils ; tendrils branched .. .. 20. **Bryonopsis**

Anthers united, filaments free ; male receptacle long, funnel-shaped, globose at the base ; monoecious ; tendrils branched .. .. 21. **Peponium**

Corolla shortly lobed to about or above the middle ; anthers united, filaments free :

Ovary densely setose with stiff jointed hairs ; staminodes absent ; dioecious ; tendrils simple .. .. 22. **Raphidiocystis**

Ovary not densely setose ; staminodes present ; monoecious ; tendrils branched .. .. 23. **Cucurbita**

Filaments united into a column ; anthers united ; corolla campanulate ; leaves pustulate-scabrid .. .. 24. **Coccinia**

Besides the above, *Cyclanthera explodens* Naud., a native of tropical America, has been collected at Buea, British Cameroons (*Dalz.* 8221), where it is probably introduced.

Several incomplete specimens which cannot at present be identified are also known from our area and may represent genera not included in the above key.

Cogniaux and Harms in Engl. Pflanzenr. Cucurbit. 2 : 99 (1924) record *Sphaerosicyos sphaericus* (E. Mey.) Hook. f. from Loko, R. Benue, Nigeria (*Gürich* 43). This species is widespread in East and Southern Africa, but is not at present known in our area, apart from this record. Specimens of *Sphaerosicyos* and *Adenopus* may easily be confused so the record of the former in Nigeria is open to some doubt.

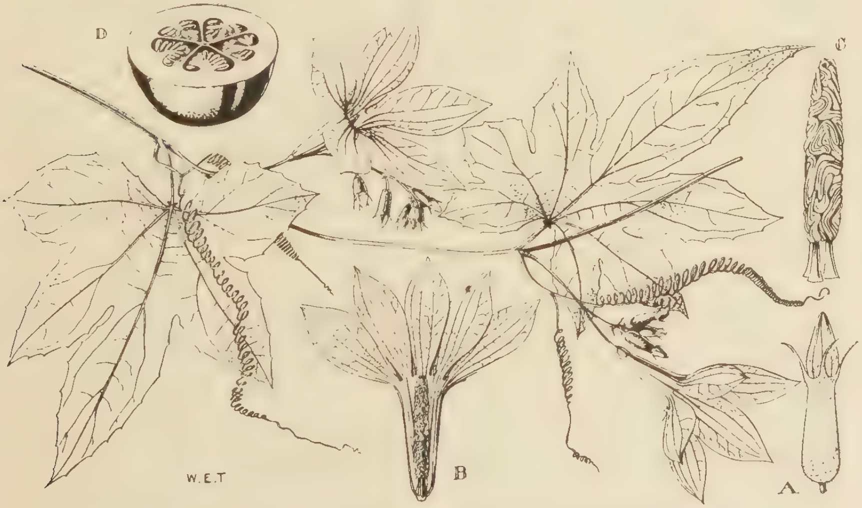

FIG. 81.—ADENOPUS BREVIFLORUS *Benth.* (CUCURBITACEAE).

A, male flower-bud. B, male flower laid open. C, stamens. D, cross-section of fruit.

1. ADENOPUS Benth.—F.T.A. 2 : 527.

*Calyx-tube of male flower 4–5 cm. long :

Calyx-tube of male flower very shortly puberulous, lobes 3 mm. long with hardened glands on the margin ; stems glabrous ; leaves glabrous, trilobed or obscurely

5-lobed, more or less truncate at base, denticulate, 7–10 cm. long, about 7 cm. broad, 3-nerved at base ; tendrils simple .. .. 1. *guineensis*

Calyx-tube of male flower densely rufous-pilose, lobes without glands ; stems pubescent ; leaves scabrid above, pubescent beneath, obscurely 3- or 5-lobed, widely cordate at base, denticulate, 8–16 cm. long, 6–14 cm. broad, 5-nerved at base ; tendrils branched, but usually with one of the branches poorly developed 2. *rufus*

*Calyx-tube of male flower 2–3 cm. long, very shortly puberulous, lobes without glands ; stems glabrous or sparsely pubescent ; leaves scabrid above :

Leaves mostly distinctly 5-lobed, markedly undulate-dentate, 8–17 cm. long and broad ; tendrils branched .. .. 3. *breviflorus*

Leaves not lobed, denticulate, ovate to lanceolate-ovate, 7–12 cm. long, 4–7 cm. broad ; tendrils simple .. .. 4. *ledermannii*

1. **A. guineensis** (*G. Don*) *Exell* in J. Bot. 72 : 42 (1934). *Bryonia guineensis* G. Don (1834). *A. longiflorus* Benth. (1849)—F.T.A. 2 : 528 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 225 ; Chev. Bot. 289 ; F.W.T.A., ed. 1, 1 : 176. Herbaceous climber in regrowth bush, with white, faintly fragrant flowers, apparently opening in the evening ; female flowers and fruits not known.
S.L.: *Don* ! *T. Vogel* ! Roruks (July) *Deighton* 3261 ! Joru, Gaura (Oct.) *Deighton* 5192 ! **Iv.C.:** Middle Cavally (July) *Chev.* 19372. Upper Cavally (May) *Chev.* 21394.

2. **A. rufus** *Gilg* in Engl. Bot. Jahrb. 34 : 346 (1904) ; Cogn. & Harms l.c. 227. Herbaceous climber in regrowth bush ; flowers white or yellowish ; fruit subglobose, about 4 in. diam., dark green with small orange and large cream oval blotches.
S.L.: Gbesebu, Kamagai (Aug.) *Deighton* 5561 ! R. Jong, Mattru (Sept.) *Adames* 4363 ! Panguma *Deighton* 4881 ! Also in French Cameroons.

3. **A. breviflorus** *Benth.*—F.T.A. 2 : 528 ; Cogn. & Harms l.c. 229 ; Chev. Bot. 289. *Lagenaria angolensis* Naud.—Chev. Bot. 289. *Luffa angolensis* of Chev. Bot. 291. A perennial, climbing high over trees ; flowers fragrant, white with dark veins, closed by day ; fruit oblong-ellipsoid, about 4 in. long, dark green with large and small oval cream blotches.
Sen.: Kounoum *Leprieur* ; *Perrottet*. **Fr.G.:** Kouria (Aug.) *Chev.* 14653 ! Ditinn (Apr.) *Chev.* 13529 ! **S.L.:** *T. Vogel* ! **Iv.C.:** Middle Cavally (July) *Chev.* 19328 ; 19358. **G.C.:** Aburi (July) *Johnson* 127 ! **Dah.:** Hollis country (Feb.) *Chev.* 22946 ! **N.Nig.:** Borgu *Barter* 710 ! Katsina Ala (fl. & fr. Dec.) *Dalz.* 735 ! Lemme (May) *Lely* 150 ! **S.Nig.:** Lagos *Millen* 213 ! *Rowland* ! R. Ogun, Lagos *Millen* 146 ! Ibadan (fr. Dec.) *Meikle* 896 ! Aguku *Thomas* 617 ! Also in Principe, S. Tomé and widespread in tropical Africa generally. (See Appendix, p. 53.)

4. **A. ledermannii** *Harms* in Engl. Pflanzenr. Cucurbit. 2 : 230 (1924). A slender climber ; leaves bright green, flowers greenish-white.
Br.Cam.: Likomba (Nov.) *Mildbr.* 10732 ! Johann-Albrechtshöhe *Staudt* 560 (?). Also in French Cameroons.

2. **LAGENARIA** Seringe—F.T.A. 2 : 529.

A climbing herb ; branches more or less densely pilose with jointed hairs ; leaves with two small pore-like glands at the base, widely ovate with a broad sinus at the base, up to 20 cm. broad, denticulate, sometimes caudate-acuminate, softly tomentellous beneath with spicular hairs ; tendrils branched ; male flowers solitary on elongated pedicels ; calyx-tube campanulate, about 1·5 cm. long, pubescent, lobes triangular ; petals white, free, obovate, mucronate, denticulate, about 4 cm. long and 3 cm. broad, pilose within the base ; ovary villous ; fruits very variable in size and shape *siceraria*

L. siceraria (*Molina*) *Standl.* in Publ. Field Mus. Nat. Hist. Chicago Bot. Ser. 3 : 435 (1930). *Cucurbita siceraria* Molina (1782). *L. vulgaris* Ser. (1825)—F.T.A. 2 : 529 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 201 ; Chev. Bot. 290 ; F.W.T.A., ed. 1, 1 : 176. The Calabash, Bottle-Gourd or White Pumpkin.
Sen.: *Brunner* ! **Fr.Sud.:** Sarankoro (Feb.) *Chev.* 360. **S.L.:** Roruks (July) *Deighton* 1329 ! Sendugu (June) *Thomas* 570 ! Binkolo (Aug.) *Thomas* 1792 ! **Lib.:** Cape Palmas *Dinklage*. **Iv.C.:** N. Baoulé (July, Aug.) *Chev.* 22113 ; 22237. **G.C.:** *Brown* 416 ! Achimota (Aug.) *Irvine* 865 ! **Togo:** Lome *Warnecke* 352 ! **N.Nig.:** Sokoto *Lely* 153 ! Katagum *Dalz.* 120 ! 121 ! 122 ! **S.Nig.:** Ado (fr. Mar.) *Cons. of Forests* 478 ! Obu *Thomas* 517 ! Cultivated and subspontaneous in the tropics of both hemispheres. (See Appendix, p. 58.)

3. **CAYAPONIA** Manso—F.T.A. 2 : 568, as *Trianosperma* Mart.

A slender climber, 5–7 m. high ; branches scabrid ; tendrils mostly simple ; leaves triangular-ovate, shallowly 3-lobed, 3-nerved and with a sessile gland on each side of the decurrent base, shortly dentate, acute, 5–8 cm. long, scabrid ; petiole slender, twining, $\frac{1}{2}$–$\frac{1}{3}$ as long as the leaf ; male flowers axillary, solitary or fasciculate ; fruit shortly stalked, ellipsoid, 1·5 cm. long, pericarp brittle, smooth .. .. *africana*

C. africana (*Hook. f.*) *Exell* in Cat. S. Tomé 186 (1944). *Trianosperma africana* Hook. f. in F.T.A. 2 : 568 (1871). *C. latebrosa* Cogn. in DC. Monogr. 3 : 776 (1881), partly ; F.W.T.A., ed. 1, 1 : 177.
Gam.: Albreda *Perrottet*. **G.C.:** Akim Oda (fr. Dec.) *Akpabla* 82 ! **S.Nig.:** Lagos *Millen* 60 ! *Dawodu* 264 ! **Br.Cam.:** Cam. Mt., 1,000 ft. (Dec.) *Mann* 1253 ! Also in S. Tomé.

4. **TROCHOMERIA** Hook. f.—F.T.A. 2 : 524.

Leaves slightly setulose mainly on the nerves beneath, digitately 5-lobed nearly to the base, lobes acute, coarsely dentate with few teeth ; male flowers few, in very long-stalked racemes ; pedicels slender, elongated, glabrous ; calyx-teeth minute, recurved; petals filiform, 4–5 cm. long .. .. 1. *macroura*

Leaves rather densely scabrid-setose more or less all over the lower surface, digitately 3–7-lobed almost to the base, lobes linear to narrowly ovate, acute, entire, or rarely the leaves with broad triangular lobes or teeth ; male and female flowers subfasciculate ; pedicels comparatively short ; calyx-teeth minute ; petals up to 5 cm. long, broadened towards the base .. .. 2. *dalzielii*

1. **T. macroura** *Hook. f.* in F.T.A. 2 : 525 (1871) ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 189 ; Chev. Bot. 289. A " climber in open country among low trees."
Fr.Sud.: Kodjar, Gourma (July) *Chev.* 24387. **Dah.:** Agouagou (May) *Chev.* 23517. **N.Nig.:** Nupe *Barter* 1524 ! Also in Ubangi-Shari-Chad. (See Appendix, p. 64.)

2. **T. dalzielii** *Bak. f. ex Hutch.* F.W.T.A., ed. 1, 1 : 177 (1927) ; Kew Bull. 1928 : 214. A climber on grass-stems and low shrubs ; arising after grass-fires form a fleshy yam-like root ; flowers green or brownish-tinged.
N.Nig.: Kontagora (Dec.) *Dalz.* 280 ! Nupe *Barter* ! Katagum *Dalz.* 374 ! Abinsi *Dalz.* 736 ! Kyana (Feb.) *Hepburn* 6 ! Mada Hills (June) *Hepburn* 70 ! Jira (May) *Lely* 126 ! (See Appendix, p. 64.)

Imperfectly known species.

T. atacorensis *A. Chev.* Bot. 288, name only. Possibly a form of *T. dalzielii.*
Fr.Sud.: Gourma (July) *Chev.* 24397 ! **Dah.:** Atacora Mts. (June) *Chev.* 14000.

This genus has not been revised for this edition. It is at present extremely difficult to assess the range of variation which may be expected to occur in a species. Carefully collected specimens are much needed, and it is particularly important that the specimens should show the range of variation on individual plants and that each individual should be numbered separately.

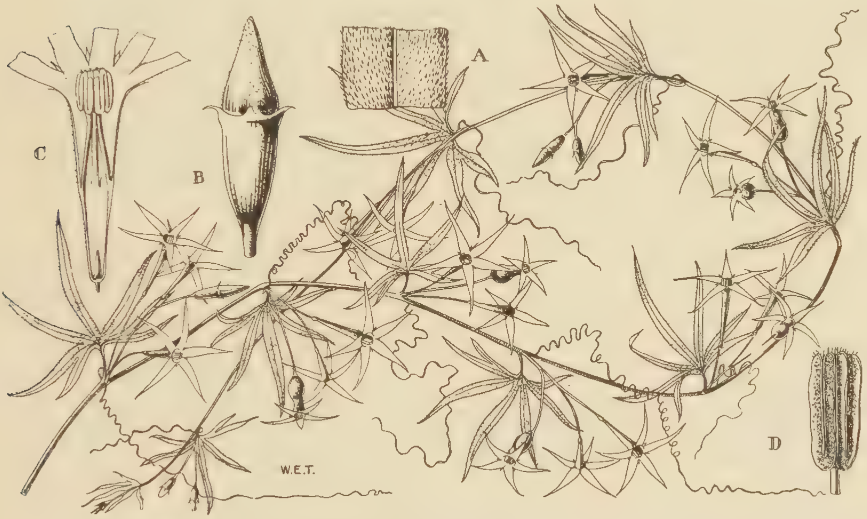

FIG. 82.—TROCHOMERIA DALZIELII *Bak. f.* (CUCURBITACEAE).
A, portion of leaf. B, male flower-bud. C, male flower laid open. D, anther.

5. LUFFA Mill.—F.T.A. 2 : 530.

Fruits 2–2·5 cm. long, covered with stout barbed bristles ; petals 1–1·2 cm. long 1. *echinata*

Fruits 15–50 cm. long, smooth ; petals 2–3 cm. long :
  Fruits not ridged ; seeds smooth, narrowly winged ; leaves often deeply digitately lobed, about 7-nerved at the base, scabrid, lobes denticulate ; petiole pubescent 2. *aegyptiaca*
  Fruits with up to 10 *sharp longitudinal ridges ; seeds rugose, not winged ; leaves more or less as above, but paler and not so deeply lobed .. .. acutangula*

1. **L. echinata** *Roxb.*—F.T.A. 2 : 531 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 73. Trailing or climbing herb ; flowers yellow.
N.Nig.: Kaza, Bornu (Nov.) *Davey* FHI 27115 ! Also in A.-E. Sudan, Abyssinia, Natal and tropical Asia.

2. **L. aegyptiaca** *Mill.*—F.T.A. 2 : 530 ; Chev. Bot. 291. *L. cylindrica* M. J. Roem.—Cogn. & Harms l.c. 2 : 62 ; F.W.T.A., ed. 1, 1 : 177 ; Chev. Bot. 291. The Loofah Gourd ; an annual climber with yellow flowers. Cultivated, and commonly naturalized.
Sen.: *Talmy* ! *Heudelot* 217. **Fr.Sud. & Fr.G.:** *fide* Chev. *l.c.* **S.L.:** Kambia (Jan.) *Sc. Elliot* 4444 ! Njala (Sept.) *Deighton* 2243 ! **Lib.:** Sinoe Basin *Whyte* ! Ganta (May) *Harley* ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Accra *Moloney* 5 ! **N.Nig.:** Jebba *Barter* ! Katagum *Dalz.* 130 ! **S.Nig.:** Lagos *Dawodu* 369 ! R. Niger, Ibo country (Aug.) *T. Vogel* 41 ! Aguku *Thomas* 768 ! **F.Po:** (Nov.) *T. Vogel* 78 ! Common throughout the tropics. (See Appendix, p. 61.)

Doubtfully recorded species.

L. acutangula *Roxb.*—F.T.A. 2 : 530 ; Holl. 2 : 331 ; Cogn. & Harms l.c. 68. Like the preceding. An Asiatic species which is probably only rarely cultivated in tropical Africa ; Holland and Dalziel both record it from our area. The fruit of the only specimen (*Sc. Elliot* 4641) cited in F.W.T.A., ed. 1, 1 : 177 is *L. aegyptiaca*, while the leaves are those of a *Cucurbita* and of an unidentifiable *Luffa.* (See Appendix, p. 61.)

6. **COGNIAUXIA** Baill. in Bull. Soc. Linn. Paris 1 : 423 (1884).

A climber ; branches puberulous ; leaves broadly ovate, deeply cordate, with a wide sinus, acutely acuminate, entire or slightly lobulate-toothed, 15–20 cm. long and broad, thinly coriaceous, very conspicuously and closely reticulate beneath, with prominent looped nerves ; petiole not glandular, 4–6 cm. long ; tendrils bifurcate ; male flowers corymbose-racemose on long axillary peduncles ; bracts linear ; calyx-tube narrowed towards the apex, up to 1·5 cm. long, puberulous ; sepals short, triangular, with subulate points ; petals conspicuous in bud, obovate, mucronate, 3–4 cm. long, entire, nervose, finely puberulous ; female flowers not seen *podolaena*

C. podolaena *Baill.* in Bull. Soc. Linn. Paris 1 : 424 (1884) ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 197. *Luffa batesi* C. H. Wright in Hook. Ic. Pl. t. 2490 (1896). Climbing plant up to 20 ft. long ; flowers yellow.
Br.Cam.: Cameroons R. (Jan.) *Mann* 719! Barombi *Preuss* 158. Also in French Cameroons, Spanish Guinea, Belgian Congo and North Angola.

7. **BAMBEKEA** Cogn. in Bull. Jard. Bot. Brux. 5 : 115 (1916).

Dioecious climbing herb, glabrous ; leaves broadly ovate-cordate, subentire to deeply 5-lobed, 10–25 cm. long and broad, lobes acutely acuminate, petiole 6–15 cm. long ; tendrils branched ; male inflorescence a 10–20-flowered raceme, 4–13 cm. long, pedicels spreading, 2–4 mm. long ; receptacle saucer-shaped, sepals lanceolate about 3 mm. long ; petals about 8 mm. long and 5 mm. broad ; female flowers in racemes 5–12 cm. long with pedicels 3–7 mm. long ; ovary glabrous .. .. *racemosa*

B. racemosa *Cogn.* in Bull. Jard. Bot. Brux. 5 : 116 (1916) ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 173, t. 20. Stems intensely green ; flowers yellow or orange.
S.Nig.: Okomu F.R. (Feb.) *Brenan* 9041! 9139! Sapoba *Kennedy* 2634! **Br.Cam.:** Barombi *Preuss* 295. Also in French Cameroons and Belgian Congo.

8. **GERRARDANTHUS** Harv.—F.T.A. 2 : 519, as *Atheranthera* Mast.

A slender climber, with spirally coiled axillary tendrils ; branches glabrous, grooved ; leaves ovate-rounded, widely cordate at base, acutely caudate-acuminate, 9–12 cm. long, 7–9 cm. broad, very thin, entire, digitately 5-nerved ; petioles up to half as long as the leaves, slender ; tendrils exceeding the leaves, very slender ; sepals oblong-ovate, rounded at apex, about 2 mm. long, thin, nervose outside ; petals unequal, about 1 cm. long .. .. *zenkeri*

G. zenkeri *Harms & Gilg ex Cogn.* in Engl. Pflanzenr. Cucurbit. 1 : 21 (1916). *G. nigericus* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 178 (1927) ; Kew Bull. 1928 : 215. Petals pale yellow ; fruit subcylindrical, 3-sided at apex, about 3 in. long, green, with reddish-brown seeds.
G.C.: Kumasi *Cummins* 146! **S.Nig.:** Oban *Talbot* 1454! Degema *Talbot* 3628! Also in French Cameroons.

9. **CTENOLEPIS** Hook. f. ex Naud.—F.T.A. 2 : 557. *Blastania* Kotschy & Peyr.—F.W.T.A., ed. 1, 1 : 178.

Slender twiner ; stems slightly scabrid, ribbed ; leaves digitately 3–5-partite, up to about 7 cm. long, thin, lobes sharply toothed, scabrid-pubescent ; petiole pubescent ; bract foliaceous and resembling a stipule at the base of the inflorescence, ovate-orbicular, narrowed to the base, fimbriate, about 1 cm. long ; male flowers few and very small on a common axillary peduncle up to 2 cm. long, female solitary, subsessile or shortly pedicellate ; fruit few-seeded, globose, smooth, 1–1·5 cm. in diam. *cerasiformis*

C. cerasiformis (*Stocks*) *Naud.*—F.T.A. 2 : 258. *Zehneria cerasiformis* Stocks (1852). *Blastania fimbristipula* Kotschy & Peyr. (1867)—Cogn. in Engl. Pflanzenr. Cucurbit. 1 : 133 ; F.W.T.A., ed. 1, 1 : 178. Flowers creamy-white ; fruit scarlet, cherry-like.
Sen.: *Farmar* 123! Waco *Perrottet*. Dagana *Leprieur*. **Fr.Sud.:** Bara (Sept.) *Hagerup* 369! **N.Nig.:** Katagum *Dalz.* 118! Extends to Eastern Sudan, Abyssinia, Angola, East and South Africa ; also in Arabia and India. (See Appendix, p. 53.)

10. **MELOTHRIA** Linn.—F.T.A. 2 : 562.

Male flowers (where known) more or less umbellate, or racemose, on common axillary peduncles ; female flowers and fruits shortly pedicellate ; stamens with well-developed filaments ; dioecious :
Leaves truncate at base, repand-dentate, acutely acuminate, 5–6 cm. long, 3–4 cm. broad at base, shortly hispid on the nerves beneath ; petiole setulose ; fruit not known .. .. 1. *mannii*
Leaves deeply cordate at base :
  Fruits smooth ; male flowers 2–8 together borne at the apex of a filiform, 5–20 mm. long peduncle :
    Stems and under-surface of leaves glabrous or sparsely pubescent :

Leaves pentagonal-ovate with two short lateral lobes, 6–8 cm. long, 5–6 cm. broad, petiole 4–5 cm. long .. .. 2. *minutiflora* var. *minutiflora*
Leaves as above, but 1·5–3 cm. long, 12–23 mm. broad, petiole 1·5–3 cm. long 2a. *minutiflora* var. *parvifolia*
Stems and under-surface of leaves hirsute ; leaves scarcely lobed, 5–7 cm. long, 4–7 cm. broad, petiole 5–8 cm. long .. .. 2b. *minutiflora* var. *hirtella*
Fruits shallowly pitted ; leaves scabrid above, shortly pilose beneath :
Leaves with subentire margin, shortly 5-lobed, pentagonal in outline, widely cordate, 4–6 cm. long .. .. 3. *fernandensis*
Leaves with markedly dentate margin, ovate or 3–5-lobed, cordate at base, 3–7 cm. long, 2–5 cm. broad .. .. 4. *punctata*
Male flowers solitary or in axillary fascicles ; anthers subsessile ; monoecious :
Female flowers and fruits sessile or nearly so ; fruits globose, almost 1 cm. in diam., sparingly setulose ; stems very scabrid ; leaves shortly and subhastately lobed, deeply cordate at base, subacute at apex, up to 12 cm. long, denticulate or subentire, mostly very scabrid .. .. 5. *maderaspatana*
Female flowers and fruits on slender pedicels ; stems glabrous or sparsely pubescent, not scabrid :
Fruits globose ; leaves not or hardly lobed :
Leaves broadly triangular, truncate or nearly so at base with the basal lobes acute, apex acute, margin denticulate, 3–7 cm. long and broad .. 6. *capillacea*
Leaves ovate-cordate, cordate at base with rounded basal lobes, apex obtuse, margin entire or subentire, 4–6 cm. long and broad .. .. 7. *cordifolia*
Fruits ovoid or fusiform, acute at apex ; leaves mostly triangular-hastate with divergent lobes, often deeply lobed :
Fruit ovoid, 15–16 mm. long, 7–8 mm. broad ; seed marginate .. 8. *deltoidea*
Fruit spindle-shaped, 20–30 mm. long, 7–10 mm. broad ; seed not marginate 9. *tridactyla*

1. **M. mannii** *Cogn.* in DC. Monogr. 3 : 617 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 119. *Zehneria deltoidea* Hook. f. in F.T.A. 2 : 560 (1871), not of Miq. A slender climber, 12–15 ft. ; female flowers not known.
Br. Cam.: Cam. Mt., 4,500 ft. (Feb.) *Mann* 1277 !

2. **M. minutiflora** *Cogn.* var. **minutiflora**—DC. Monogr. 3 : 611 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 110, partly (excl. t. 23). *Zehneria micrantha* Hook. f. in F.T.A. 2 : 560 (1871), not of F. v. Muell. A very slender climber, 8–10 ft.
Br.Cam.: Cam. Mt., 7,000 ft. (Dec.) *Mann* 2010 ! Also in French Cameroons.

2a. **M. minutiflora var. parvifolia** *Cogn.* in Engl. Pflanzenr. Cucurbit. 1 : 111 (1916).
Br.Cam.: Cam. Mt., 8,000 ft. *Preuss* 929.

2b. **M. minutiflora** var. **hirtella** *Cogn.* l.c. (1916).
Br.Cam.: Cam. Mt., Buea, 3,000 ft. *Preuss* 958 !

3. **M. fernandensis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 179 (1927) ; Kew Bull. 1928 : 215. *M. sczobiculata* of Cogn. l.c. 104, partly. A climber, 20 ft. ; female flowers white, turning yellow ; male flowers not known.
F.Po: 3,000 ft. (Dec.) *Mann* 628 !

4. **M. punctata** (*Thunb.*) *Cogn.* in DC. Monogr. 3 : 615 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 117, t. 26. *Bryonia punctata* Thunb. (1794). A slender climber.
Br.Cam.: Bamenda (fl. & fr. Feb.) *Migeod* 476 ! *Ledermann.* Widespread in tropical and S. Africa ; also in Madagascar and Java.

5. **M. maderaspatana** (*Linn.*) *Cogn.* in DC. Monogr. 3 : 623 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 126, t. 29. *Cucumis maderaspatanus* Linn. (1753). *Mukia scabrella* (Linn. f.) Arn.—F.T.A. 2 : 561 ; Chev. Bot. 296. A prostrate or scandent annual, scabrid, with small white almost prickly hairs ; flowers white or yellow ; berry red ; a common weed.
Sen.: Dakar (fl. & fr. May) *Baldwin* 5708 ! **Gam.:** *Ingram* ! *Brown-Lester* ! Cape St. Mary (fr. Jan.) *Dalz.* 8126 ! **Fr.Sud. & Fr.G.:** *fide* Chev. *l.c.* **S.L.:** Kambia, R. Scarcies (fr. Dec.) *Sc. Elliot* 4360 ! Njala (Nov.) *Deighton* 3988 ! Musaia (fl. & fr. July) *Deighton* 4799 ! Yetaya (fl. & fr. Sept.) *Thomas* 2293 ! 2397 ! **Iv.C.:** Toura (May) *Chev.* 21638. Nzi (Aug.) *Chev.* 22290. **Togo:** Lome *Warnecke* 345 ! Kpedsu (fl. & fr. Jan.) *Howes* 1090 ! **Fr.Nig.:** Niamey (fl. & fr. Oct.) *Hagerup* 496 ! **N. Nig.:** Nupe *Barter* 1076 ! 1520 ! Kaduna (fl. & fr. Dec.) *Meikle* 769 ! Jos (fl. & fr. Sept.) *Lely* 579 ! Katagum *Dalz.* 124 ! **S.Nig.:** Lagos *MacGregor* 56 ! Ibadan (Nov.) *Newberry* 167 ! Widespread in tropical Africa and Asia ; also in Australia. (See Appendix, p. 62.)

6. **M. capillacea** (*Schum. & Thonn.*) *Cogn.* in DC. Monogr. 3 : 600 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 99, t. 22. *Bryonia capillacea* Schum. & Thonn. (1827). *M. triangularis* Benth.—F.T.A. 2 : 562. *M. deltoidea* of F.T.A. 2 : 563, of Chev. Bot. 296 and of F.W.T.A., ed. 1, 1 : 178, not of (Schum. & Thonn.) Benth. A very slender climber ; flowers white ; ripe berry reddish.
S.L.: Baiama, Barri (fl. & fr. Dec.) *Deighton* 3797 ! Suba, Nongoba Bullom (Oct.) *Jordan* 593 ! Njala (fl. & fr. Aug.) *Deighton* 3226 ! **Lib.:** Gbanga (fr. Sept.) *Linder* 703 ! **Iv.C.:** Nzi Valley (Aug.) *Chev.* 22236 ! **G.C.:** Kumasi *Cummins* 153 ! Pokoase, nr. Accra (fr. Apr.) *Irvine* 1591 ! **Togo:** Lome *Warnecke* 280 ! **Dah.:** Zagnanado (Feb.) *Chev.* 22977. **S.Nig.:** Lagos *Rowland* ! R. Ogun *Millen* 135 ! Ibadan (Jan.) *Meikle* 964 ! Brass *Barter* 1843 ! Aboh *Barter* 1522 ! *T. Vogel* 45 ! R. Nun *Barter* 2130 ! **F.Po:** (June, Nov.) *T. Vogel* 203 ! *Mann* 418 ! Widespread in central and E. Africa.

7. **M. cordifolia** *Hook. f.* in F.T.A. 2 : 563 (1871) ; Cogn. in Engl. Pflanzenr. Cucurbit. 1 : 102. A slender climber.
Lib.: Cape Palmas *Dinklage* 2386. Also in Gabon and S. Tomé.

8. **M. deltoidea** *Benth.* in Hook. Fl. Nigrit. 368 (1849), excl. spec. *Vogel* ; Cogn. l.c. 94, t. 21 excl. spec. *Vogel* 45 and *Barter* 1522. *Bryonia deltoidea* Schum. & Thonn. (1827). Slender climber ; flowers pale yellow turning orange ; fruit reddish when ripe.
Sen.: *fide* Cogn. *l.c.* **S.L.:** Maswari (fl. & fr. Nov.) *Deighton* 5645 ! **G.C.:** *Thonning.* Odumase, Krobo *Irvine* 1023 ! **Togo:** Lome *Warnecke* 303. Bismarckburg *Büttner* 163. **N.Nig.:** Zaria (fl. & fr. Dec.) *Milne-Redhead* 5006 ! 5008 ! Bauchi Plateau (fl. & fr. July) *Lely* P. 393 ! Also in French Cameroons, Gabon, Belgian Congo and Mozambique.

9. **M. tridactyla** *Hook. f.* in F.T.A. 2 : 562 (1871) ; Cogn. l.c. 96 ; Chev. Bot. 296. *M. gourmaensis* of Chev. Bot. 296. A rather slender climber ; flowers very small, yellow ; fruit reddish when ripe.
Sen.: Bondou *Heudelot* 198. **Fr.Sud.:** Souloula (Mar.) *Chev.* 671. Gourma (July) *Chev.* 24536. **S.L.:** Pendembu (fr. July) *Thomas* 803 ! Kamakwie (Mar.) *Deighton* 4600 ! **Lib.:** Gbanga (Sept.) *Linder* 733 ! **G.C.:** Achimota (fr. Oct.) *Milne-Redhead* 5163 ! **N.Nig.:** Katagum (Oct.) *Dalz.* 127 ! **S.Nig.:** Lagos Colony (Sept.) *Foster* 342 ! Extends to Angola, E. Africa and Mascarene Islands.

Imperfectly known species.

M.sp. Slender herbaceous climber ; male flowers white in racemes 3–7 cm. long ; female flowers white in shortly pedunculate umbels.
S.Nig.: Akure F.R. (Oct.) *Keay* FHI 25457 ! Okomu F.R. (Dec.) *Brenan* 8509 ! Evidently the same as *Zenker* 3682 from Bipinde, French Cameroons, cited by Cogniaux in Engl. Pflanzenr. Cucurbit. 1 : 111 as *M. minutiflora* Cogn., and the same as Cogniaux's plate (l.c. t. 23), but distinct from the type and description.

11. **OREOSYCE** Hook. f.—F.T.A. 2 : 548.

A slender climber, 3–4 m. high ; tendrils slender, simple ; leaves ovate, rather narrowly cordate at the base, very acute, 5–7 cm. long, slightly lobulate and acutely dentate, setose-scabrid with bulbous-based hairs ; petiole slender, often longer than the leaf ; flowers monoecious, about 3–4 in the leaf-axils, shortly pedicellate, small ; male calyx-tube setulose, 5 mm. long, with subulate lobes 2–3 mm. long ; corolla-lobes setulose outside ; ovary densely hispid .. .. *africana*

O. africana *Hook. f.* in F.T.A. 2 : 548 (1871) ; Cogn. in Engl. Pflanzenr. Cucurbit. 1 : 68. Petals yellow.
Br.Cam.: Cam. Mt., 7,000 ft. (Dec.–Mar.) *Mann* 1285 ! 2025 ! *Richards & Brenan* 9527 ! **F.Po:** *Mann* ! El Pico, 5,000 ft. (Dec.) *Boughey* 176 !

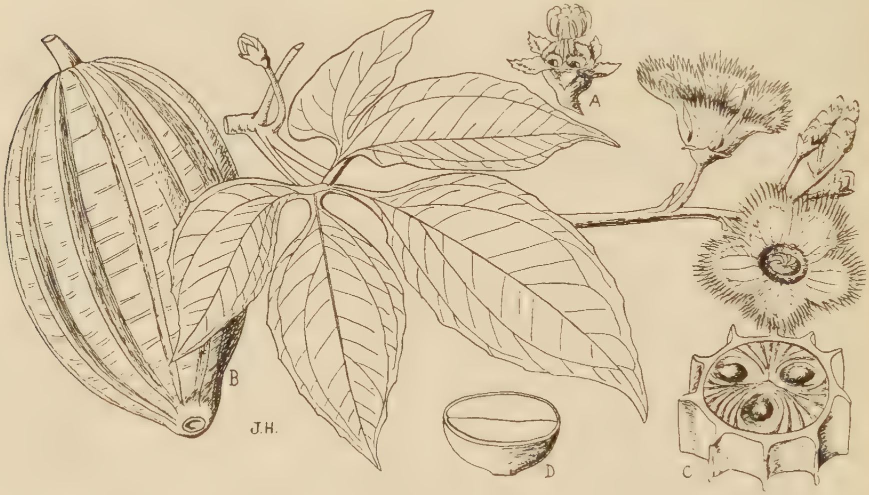

FIG. 83.—TELFAIRIA OCCIDENTALIS *Hook. f.* (CUCURBITACEAE).

A, male flower with corolla removed. B, fruit. C, cross-section of fruit. D, cross-section of seed.

12. **KEDROSTIS** Medic.—F.T.A. 2 : 563, as *Rhynchocarpa* Schrad.

A slender twiner ; stems weakly pilose ; leaves ovate or ovate-triangular, deeply cordate at base, subacute at apex, up to 10 cm. long and 6 cm. broad, sinuate-dentate, scabrid-pubescent ; petiole about $\frac{1}{3}$ as long as the leaf ; flowers axillary, the males pedicellate on a short common peduncle, the female solitary and subsessile ; fruits about 1·5 cm. long, ovoid-ellipsoid, beaked by the persistent style, long-pilose *foetidissima*

K. foetidissima (*Jacq.*) *Cogn.* in DC. Monogr. 3 : 634 (1881) ; Engl. Pflanzenr. Cucurbit. 1 : 140. *Trichosanthes foetidissima* Jacq. (1788). *Rhynchocarpa foetida* Schrad.—F.T.A. 2 : 564 ; Chev. Bot. 297. A climber, up to 8 ft. high, with an unpleasant smell ; flowers small, yellowish ; fruit scarlet or crimson when ripe.
Sen.: *Perrottet.* Walo (Apr.) *Leprieur* ! Richard Tol *Lelievre.* **Fr.Sud.:** Macina (Sept.) *Chev.* 24824 ! Gao (Feb., Sept.) *De Wailly* 4955 ! 5217 ! **G.C.:** Achimota (fr. July) *Milne-Redhead* 5115 ! **Fr.Nig.:** Zinder (fl. & fr. Nov.) *Hagerup* 615 ! **N.Nig.:** Katagum (Sept.) *Dalz.* 116 ! Extends to Abyssinia and Somaliland, East and South Africa and Angola. (See Appendix, p. 58.) [*Dalziel* 128 from Katagum, Nigeria, cited in Edition 1 as this species, has very much longer fruits and appears to be a species of *Toxanthera* Hook. f. Further material is required to identify this plant with certainty.]

13. **DIMORPHOCHLAMYS** Hook. f.—F.T.A. 2 : 549:

A slender climber 4–5 m. high : branches glabrous ; leaves ovate to ovate-orbicular, widely and shortly cordate at base, acutely acuminate, 10–13 cm. long, denticulate, closely reticulate, scabrid ; petiole with a large leathery gland in the axil, slightly twining, about 1·5 cm. long, becoming verrucose ; male flowers several on a short peduncle ; bracts imbricate ; pedicels short and with broad decurrent wings from the calyx ; calyx-lobes ovate, subacute, about 4 mm. long ; corolla campanulate, tube 1·5 cm. long, lobes ovate, about 1 cm. long ; fruit spherical, about 6–7 cm. in diam., crowned by the reflexed appressed long-spathulate persistent calyx-lobes *mannii*

D. mannii *Hook. f.* in F.T.A. 2 : 550 (1871) ; Hook. Ic. Pl. t. 1322 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 170, t. 19 ; Chev. Bot. 293. Flowers white ; ripe fruits orange with pale yellow spots, dark green with pale spots when unripe, rough in texture.
Iv.C.: Bingerville *Chev.* 15242. Bouroukrou *Chev.* 16960. Haute-Sassandra *Chev.* 21582 ; 21617. **G.C.** Atewa Range (Feb.) *Vigne* 4437 ! **S.Nig.:** Lagos *Dawodu* 30 ! Ibadan South F.R. (fr. Feb.) *Keay & Meikle* FHI 25664 ! Calabar (Feb.) *Mann* 2312 ! *Thomson* 34 ! **Br.Cam.:** Ambas Bay *Mann* ! **F.Po:** (fr. Jan., Nov.) *T. Vogel* 61 ! *Mann* 161 ! Also in French Cameroons, Spanish Guinea, Cabinda and Belgian Congo. (See Appendix, p. 58.)

14. TELFAIRIA Hook. f.—F.T.A. 2 : 523.

A dioecious climber ; branches puberulous when young ; leaves pedately 3–5-foliolate ; leaflets shortly stalked, obliquely elliptic or ovate, shortly acuminate, up to 15 cm. long and 10 cm. broad, dentate in the upper $\frac{2}{3}$, very slightly scabrid beneath, 3-nerved from the base ; tendrils branched, spirally coiled above the fork ; male racemes about 15 cm. long, flowering in the upper half ; bracts subrhomboid, petiolate, leafy ; pedicels about 0·5 cm. long ; calyx-lobes tomentellous, crenate ; corolla lobes obovate, about 2 cm. long, pectinate in the upper part, puberulous outside, nervose, glandular inside .. .. *occidentalis*

T. occidentalis *Hook. f.* in F.T.A. 2 : 524 (1871) ; Cogn. in Engl. Pflanzenr. Cucurbit. 1 : 267 ; Chev. Bot. 288. A perennial climber, attaining 100 ft. in length ; corolla creamy-white with a red-purple eye ; fruit pale glaucous green, about 2 ft. long and 10 in. diam. with broad ridges ; seeds over 1 in. across ; often cultivated.
S.L.: (May) *Barter* ! Freetown *Welwitsch* 823. Njala (Sept.) *Deighton* 1763 ! **Iv.C.:** Indénié (Dec.) *Chev.* 22628. **Dah.:** Zagnanado (Feb.) *Chev.* 23089 ! **S.Nig.:** Lagos Colony *Moloney* 13 ! *Millen* 16 ! 198 ! Abeokuta (Feb.) *Irving* ! Sapoba *Kennedy* 1732 ! Ezi (Feb.) *Thomas* 2355 ! Obuampa (Jan.) *Thomas* 2222 ! Calabar (Feb.) *Mann* 2324 ! **F.Po:** (Jan.) *Mann* 233 ! (See Appendix, p. 63.)

15. MOMORDICA Linn.—F.T.A. 2 : 534.

Leaves 3–5-foliolate ; flowers subtended by a leafy bract, male subumbellate, female solitary on a long peduncle :

Bract of male inflorescence large, suborbicular, more or less toothed, 2–4 cm. diam. ; peduncle 4–7 cm. long ; pedicels densely villose ; sepals lanceolate, long-acuminate, 7–8 mm. long ; leaflets elliptic or obovate, rounded or acute at base, rather distantly mucronate-dentate, glabrous or nearly so ; tendrils simple or branched 1. *cissoides*

Bract of male inflorescence small, coriaceous ; peduncle 12–13 cm. long ; pedicels glabrous ; sepals ovate, subrotundate at apex, 2·5 mm. long ; leaflets elliptic or ovate-oblong, cuneate at base with setose teeth on the margin, minutely scabrid ; tendrils simple .. .. 2. *gilgiana*

Leaves simple, entire, angled or lobed :

Male flowers solitary, with a conspicuous bract on the peduncle :

Bract closely subtending the flower ; leaves lobed up to about the middle, lobes coarsely lobulate-dentate ; fruits becoming smooth with age, warted when young 3. *balsamina*

Bract below or near the middle of the peduncle ; leaves usually lobed to beyond the middle ; lobes more or less sinuate ; fruits muricate when young, at length with irregular lines of warts .. .. 4. *charantia*

Male flowers several, more or less corymbose or umbellate :

Male peduncle with a large broadly ovate-cordate bract at the apex, 1·5–2·5 cm. long, 2–2·5 cm. broad ; sepals lanceolate, much larger than the receptacle ; branches glandular-puberulous, grooved ; leaves broadly ovate to 3- (or rarely 5-) lobed, margin often coarsely and acutely dentate, rarely subentire, cordate with a decurrent base, scabrid-puberulous on both surfaces ; tendrils unequally branched 5. *angustisepala*

Male peduncle with a small (less than 1 cm. long) obovate or lanceolate bract, or ebracteate :

Male sepals acute ; leaves ovate-cordate, not lobed, deeply cordate at base, acuminate, minutely and remotely denticulate, sparsely and minutely scabrid on both surfaces :

Male flowers 3–4, subtended by a leafy obovate bract, 6–10 mm. long, attenuate at base ; leaves 5–7·5 cm. long, 3–5 cm. broad .. .. .. 6. *cordata*

Male flowers numerous, racemose or subcorymbose ; bracts minute or absent ; leaves 8–16 cm. long, 5–13 cm. broad .. .. 7. *multiflora*

Male sepals rounded at apex ; male flowers numerous, racemose or subcorymbose ; leaves broadly ovate-cordate, not lobed, deeply cordate at base with the lamina decurrent on the petiole, acute at apex, repand-dentate or denticulate, 8–15 cm. long, 6–12 cm. broad, scabrid-puberulous or pubescent beneath .. 8. *foetida*

1. **M. cissoides** *Planch. ex Benth.*—F.T.A. 2 : 535 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 1 (1924) ; Chev. Bot. 290. A tall graceful climber ; flowers white, with a large black-purple spot at the base of each petal ; fruit fleshy, 1½ in. long, prickly, orange-yellow, with red seeds.

Fr.G.: Fouta Djalon (Apr.) *Chev.* 13466. **S.L.:** *Sc. Elliot* 5896! Pendembu (July) *Thomas* 708! Rowala (fl. & fr. July) *Thomas* 1070! 1191! Mabonto (July) *Deighton* 3268! Kasasa, Tonko Limba (Sept.) *Adames* 190! **Lib.:** Gbanga (Sept.) *Linder* 443! 700! Flumpa, Sanokwele (Sept.) *Baldwin* 9357! Ganta (fr. Sept.) *Baldwin* 9273! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Kumasi *Cummins* 147! Aburi (June) *Johnson* 973! *Brown* 333! Achimota (fl. & fr. Apr.) *Milne-Redhead* 5066! Afram Plains (May) *Kitson* 1090! **Togo:** Lome *Warnecke* 342! **Dah.:** Sakété (Jan.) *Chev.* 22811! **N.Nig.:** Lokoja (Sept., Oct.) *Barter*! *T. Vogel*! *Dalz.* 78! Mongu (July) *Lely* 441! **S.Nig.:** Lagos *Millen* 18! 134! Abeokuta *Barter* 3395! Ibo country (Aug.) *T. Vogel* 33*a*! Degema *Talbot*! **Br.Cam.:** Victoria (Feb.) *Maitland* 421! Barombi *Preuss* 155. Belo, Bamenda (Apr.) *Maitland* 1501! **F.Po:** (May, Nov., Dec.) *T. Vogel* 157! *Barter*! *Mann* 82! Extends to Angola and A.-E. Sudan. (See Appendix, p. 63.) [Specimens from the western part of our area are more slender and have smaller bracts; they may prove to be distinct.—R.W.J.K.]

2. **M. gilgiana** *Cogn.* in Bull. Jard. Bot. Brux. 4: 221 (1914); Cogn. & Harms l.c. 16. *M. cognauxiana* Gilg (1904), not of De Wild. (1903); F.W.T.A., ed. 1, 1: 181. A twining herb with grooved stems and forked tendrils.
   Br.Cam.: Buea *Deistel* 486. Also in French Cameroons.
3. **M. balsamina** *Linn.*—F.T.A. 2: 537; Cogn. & Harms l.c. 28; Chev. Bot. 290. A climber, wild, and often planted and growing over native huts; flowers yellow (sometimes white) with a dark centre; fruit orange-yellow, beaked, 1–2½ in. long, bursting and exposing red-brown seeds; in drier regions.
   Sen.: Tivaouane (Dec.) *Chev.* 2991! Sousoun (May, June) *Chev.* 3501; 3503. **Fr.Sud.:** Timbuktu (fl. & fr. June, July) *Hagerup* 99! 229! *Chev.* 1255! **N.Nig.:** Katagum (fl. & fr. Sept.) *Dalz.* 131! Karasuwa, Nguru (fl. & fr. June) *Onochie* FHI 23355! Common in the drier parts of the tropics. (See Appendix, p. 62.)

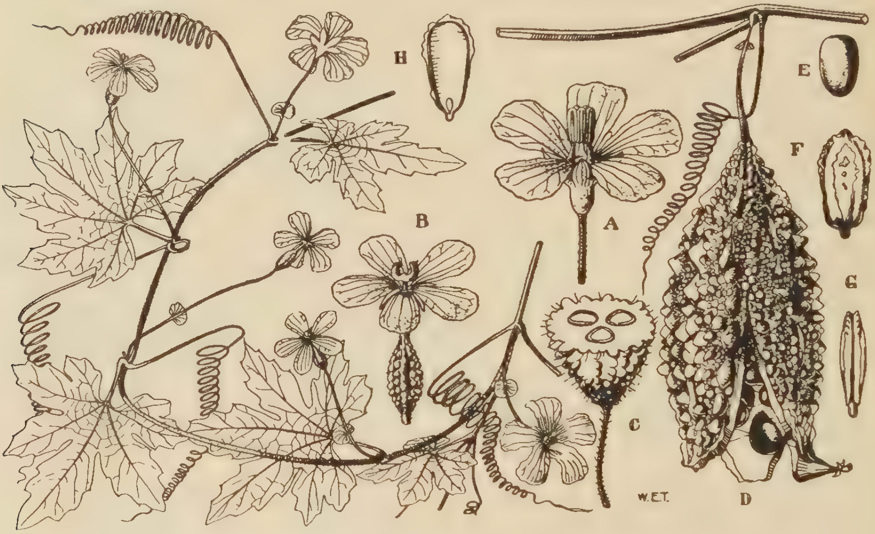

FIG. 84.—MOMORDICA CHARANTIA *Linn.* (CUCURBITACEAE).

A, male flower. B, female flower. C, cross-section of ovary. D, fruit. E, seed. F, G, face and side view of embryo. H, vertical section of seed.

4. **M. charantia** *Linn.*—F.T.A. 2: 537; Cogn. & Harms l.c. 24; Chev. Bot. 290. Climber, flowers yellow; fruit ripening orange, 2–3 in. long, bursting in 3 valves to expose the carmine red seeds; extending into moister regions.
   Sen.: *Farmar* 32! **Gam.:** *Boteler*! **Fr.Sud.:** Féréibo (Aug.) *Chev.* 2992. Djenné (Sept.) *Chev.* 2993. **S.L.:** Falaba (Apr.) *Sc. Elliot* 5446! Njala (fl. & fr. May) *Deighton* 1902! Ronietta (fl. & fr. Nov.) *Thomas* 5316! 5568! Sendugu (June) *Thomas* 596! **Lib.:** Du R. (July) *Linder* 116! Palipo, Webo (July) *Baldwin* 6600! Ganta (Sept.) *Harley*! **Iv.C.:** Bingerville (Dec.) *Chev.* 16024. Guidéko (June) *Chev.* 19001. **G.C.:** Kumasi *Cummins* 214! Asuansi (Feb.) *Williams* 17! Labadi (fr. Sept.) *Milne-Redhead* 5140! **Dah.:** Cotonou (Apr.) *Debeaux* 166! **N.Nig.:** Nupe *Barter* 733! *Yates* 12*a*! Naraguta (Aug.) *Lely* 505! Kukawa (fl. & fr. Jan.) *E. Vogel* 24! **S.Nig.:** Lagos *Rowland*! *Punch*! Akinjare, Owo (fl. & fr. Mar.) *Jones* FHI 3076! Ibuzo (Nov.) *Thomas* 2012! **Br.Cam.:** Mimbia (fl. & fr. Apr.) *Hutch.* 99! **F.Po:** (Dec.) *Mann* 58! Widespread in the warmer parts of the world. (See Appendix, p. 62.)
5. **M. angustisepala** *Harms* in Engl. Bot. Jahrb. 58: 239 (1923); Cogn. & Harms l.c. 41. *M. bracteata* Hutch. & Dalz. F.W.T.A., ed. 1, 1: 181 (1927); Kew Bull. 1928: 215. A climber; calyx black, corolla cream; stem used as a sponge; sometimes cultivated; fruit not known.
   G.C.: *Irvine* 635! Owabi (Apr.) *Andoh* FH 4186! **S.Nig.:** Ibadan (July) *Jones* FHI 18837! Ohe, Benin (Apr.) *Chizea* FHI 8286! Asaba (Dec.) *Chizea* FHI 8251! Eket *Talbot* 3133! Also in French Cameroons.
6. **M. cordata** *Cogn.* in Engl. Bot. Jahrb. 21: 208 (1895); Cogn. & Harms l.c. 39. A glabrous, slender climber.
   Br. Cam.: Victoria (Mar.) *Preuss* 1203.
7. **M. multiflora** *Hook. f.* in F.T.A. 2: 540 (1871); Cogn. & Harms l.c. 47. A slender climber; flowers yellow.
   F.Po: (Nov.) *T. Vogel* 173! Also in Gabon and Angola. [Cogn. & Harms l.c. 50 also record *M. gabonii* Cogn. from the British Cameroons (Victoria *Preuss* 1204; Barombi *Preuss* 156; Johann-Albrechtshöhe *Staudt* 788). I have not been able to see these specimens, but specimens from other areas cited as *M. gabonii* Cogn. (1881) by Cogn. & Harms do not appear distinct from the type of *M. multiflora* Hook. f. (1871), so it seems possible that the specimens from the British Cameroons do in fact belong to the latter species. —R.W.J.K.]
8. **M. foetida** *Schum. & Thonn.*—Cogn. & Harms l.c. 41, t. 4. *M. morkorra* A. Rich.—F.T.A. 2: 538; Chev. Bot. 291. *M. mannii* Hook. f. in F.T.A. 2: 539; Cogn. & Harms l.c. 43; F.W.T.A., ed. 1, 1: 182. A climber from a stout perennial root; calyx blackish-green; corolla white, sometimes yellowish; fruit

about 3 in. long, yellow or pale orange when ripe, covered with soft prickles, bursting and exposing seeds in a red pulp.
S.L.: Bumba (Sept.) *Thomas* 1956 ! **Lib.:** Gbanga (Sept.) *Linder* 468 ! **Iv.C.:** Soubré (June) *Chev.* 19146 ! Baoulé-Nord (July) *Chev.* 22024. **G.C.:** Asuansi (Feb.) *Williams* 28 ! Ankobra Junction (fr. Jan.) *Kitson* 1018 ! Bobiri F.R. (Oct.) *Andoh* FH 4917 ! **Togo:** Bismarckburg *Büttner* 656. **N.Nig.:** Bauchi Plateau (fl. & fr. July) *Lely* 423 ! P. 363 ! **S.Nig.:** Lagos *Rowland* ! Ibadan (fl. & fr. June) *Tamajong* FHI 23272 ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 766 ! Cam. Mt., 4,000–5,500 ft. (fl. & fr. Apr., Nov.) *Dundas* FHI 20378 ! *Migeod* 66 ! Barombi *Preuss* 378. **F.Po:** (Nov.–Jan.) *T. Vogel* 33 ! 170 ! *Mann* 170 ! 627 ! Widespread in tropical Africa. (See Appendix, p. 63.)

16. CUCUMIS Linn.—F.T.A. 2 : 542.

Stems and branches setose with long stiff jointed bristles ; leaves not or rarely divided beyond the middle :

Fruits smooth or at most green-lined or hairy ; a ground-trailer ; leaves broadly ovate, widely cordate at base, 5-lobed to about $\frac{1}{3}$ their length or hardly lobed, denticulate, up to about 10 cm. long, scabrid ; petiole nearly as long as the leaf ; flowers monoecious, the male few in the leaf-axils, the female solitary ; young fruits villous .. .. 1. *melo* var. *agrestis*

Fruits echinate or tuberculate :

Fruits with very numerous dense slender bristles ; leaves rounded, obscurely toothed or the lobes subentire, scabrid ; fruit broadly ovoid, 10–12 cm. long, stalk not more than about 1 cm. long .. .. 2. *dipsaceus*

Fruits with fewer stout scattered tubercles ; leaves acute, sharply dentate, bristly-setose on both surfaces ; fruit 10–12 cm. long, stalk 4–5 cm. long 3. *metuliferus*

Stems and branches more or less shortly scabrid ; leaves often divided below the middle :

Fruits with stout short tubercles, oblong-ellipsoid, 6–8 cm. long ; leaves thick, rarely divided beyond the middle, the lobes not again divided, canescent, very harshly scabrid .. .. 4. *pustulatus*

Fruits with rather slender or short soft bristles ; leaves divided nearly to the base, the lobes often lobulate :

Plants green, laxly scabrid ; fruits with long slender bristles, oblong-ellipsoid, about 4 cm. long .. .. 5. *ficifolius*

Plants canescent, densely scabrid ; fruits with very short bristles, usually more or less globose, 3–4 cm. long .. .. 6. *prophetarum*

1. **C. melo** *Linn.* var. **agrestis** *Naud.*—F.T.A. 2 : 546 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 120 (1924) ; Chev. Bot. 292. Fruit globose, obovoid or oblong, longitudinally striped with green.
Gam.: Kuntaur *Ruxton* 34 ! **Fr.Sud.:** Djenné (Sept.) *Chev.* 2982 ! **G.C.:** Achimota *Irvine* 778 ! 1819 ! Tamale (fl. & fr. Feb.) *Williams* 485 ! **Dah.:** Cotonou (Jan., Apr.) *Debeaux* 191 ! *Chev.* 22685 ! **N.Nig.:** Borgu *Barter* 748 ! Sokoto *Dalz.* 349 ! Katagum (fl. & fr. Sept.) *Dalz.* 117 ! **S.Nig.:** Obu *Thomas* 575 ! Widespread in the tropics. (See Appendix, p. 56.)
2. **C. dipsaceus** *Ehrenb. ex Spach*—F.T.A. 2 : 543 ; Cogn. & Harms l.c. 147 ; Chev. Bot. 292. A slender annual climber with pale green stem.
Gam.: *Ingram* ! Genieri (July) *Fox* 176 ! **Fr.Sud.:** Kabara (Aug.) *Hagerup* 286 ! **Iv.C.:** Bingerville *Chev.* 15241. Widespread in the drier parts of tropical Africa.
3. **C. metuliferus** *E. Mey. ex Naud.*—F.T.A. 2 : 543 ; Cogn. & Harms l.c. 146 ; Chev. Bot. 292. A yellow-flowered annual climber, with foliage like that of the cucumber ; fruit pendulous, scarlet when ripe, with stout spines.
Fr.G.: Fouta Djalon (Sept.) *Chev.* 18605. **N.Nig.:** Borgu *Barter* 1527 ! Lokoja (Oct.) *Parsons* 46 ! Zaria (fr. Dec.) *Meikle* 855 ! Katagum (Oct.) *Dalz.* 125 ! Extends to Angola, Abyssinia, East and South Africa. (See Appendix, p. 56.)
4. **C. pustulatus** *Hook. f.* in F.T.A. 2 : 544 (1871) ; Cogn. & Harms l.c. 141 ; Chev. Bot. 293. A ground-trailer from a perennial base ; flowers yellow ; fruit uniformly grey-green in colour.
Fr.Sud.: Gourma (July) *Chev.* 24472 ! **N.Nig.:** Katagum (Oct.) *Dalz.* 129 ! Kukawa (fl. & fr. Jan.) *E. Vogel* 40 ! Extends to Eastern Sudan, Abyssinia, Somaliland, Tanganyika and S.W. Africa. (See Appendix, p. 57.)
5. **C. ficifolius** *A. Rich.*—Cogn. & Harms l.c. 138. *C. figarei* Del. ex Naud.—F.T.A. 2 : 543. A ground-trailer from a perennial base ; flowers yellow.
Sen.: *Boivin* 428. Cape Verde *Waura* 406. **N.Nig.:** Sokoto *Dalz.* 348 ! Extends to Eastern Sudan, Abyssinia and Arabia ; also in Angola. (See Appendix, p. 56.)
6. **C. prophetarum** *Linn.*—F.T.A. 2 : 545 ; Cogn. & Harms l.c. 140 ; Chev. Bot. 292. A ground-trailer from a perennial base ; flowers yellow ; fruit somewhat resembling a gooseberry, with longitudinal coloured stripes.
Fr.Sud.: Timbuktu (June, Sept.) *Chev.* 1252 ! *Hagerup* 114 ! **N.Nig.:** Katagum (fl. & fr. July) *Dalz.* 123 ! Extends to Abyssinia, Somaliland, Arabia and India ; also to Angola and E. Africa. (See Appendix, p. 57.)

Besides the above *C. sativus* Linn., the Cucumber is widely cultivated.

Several of the specimens cited above lack fruits and their identification must therefore be regarded as provisional. Fruits are a crucial character in this genus and should always be collected.

17. COLOCYNTHIS Mill. Gard. Dict. Abridg., ed. 4 (1754). *Citrullus* Schrad. (1836)—F.T.A. 2 : 548.

Stems villous with soft woolly hairs ; leaves thin, glabrous or pilose, at most only slightly scabrid, more or less triangular in outline, pinnately partite, denticulate, usually about 15 cm. long .. .. 1. *citrullus*

Stems scabrid with short hairs ; leaves thicker, roughly scabrid, more or less ovate in outline, deeply and variously divided, about 10 cm. long or less .. 2. *vulgaris*

1. **C. citrullus** (*Linn.*) *O. Ktze.* Rev. Gen. Pl. 1 : 256 (1891). *Cucurbita citrullus* Linn. (1753). *Citrullus vulgaris* Schrad. (1836)—F.T.A. 2 : 549 ; Chev. Bot. 293 ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 103; F.W.T.A., ed. 1, 1 : 183. The Water Melon.

Sen.: *Heudelot* 541. **Gam.:** *Ingram*! Kuntaur *Ruxton* 22! 64! **Fr.Sud.:** Timbuktu (June) *Hagerup* 133! **S.L.:** Roruks (July) *Deighton* 1328! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** *Irvine* 799! Atuabo, W.P. (Jan.) *Dept. Agric.*! **Togo:** Lome *Warnecke* 354! **Dah.:** Cotonou (Jan., Mar.) *Debeaux* 172! *Chev.* 22701! **Fr.Nig.:** Niamey (Oct.) *Hagerup* 518! **N.Nig.:** Nupe *Barter* 1521! Katagum *Dalz.* 126! **S.Nig.:** Agulu *Thomas* 207! Calabar *Johnson*! Native of tropical and S. Africa; cultivated in all warm regions. (See Appendix, p. 53.)

2. **C. vulgaris** *Schrad.* Index Semin. Hort. Götting. 2 (1833). *Cucumis colocynthis* Linn. (1753). *Citrullus colocynthis* (Linn.) Schrad. (1838)—F.T.A. 2: 548; Chev. Bot. 293; Cogn. & Harms l.c. 2: 109; F.W.T.A., ed. 1, 1: 183. Prostrate or climbing herb; fruit globose, about 2½ in. diam., intensely bitter.
Fr.Sud.: Timbuktu (July) *Chev.* 1253. L. Faguibine (Aug.) *Chev.* 2979! Ras-el-Ma (Aug.) *Chev.* 2978. Cultivated in the Mediterranean region, the Sahara and other dry parts of tropical Africa and western Asia. (See Appendix, p. 54.)

18. CUCUMEROPSIS Naud.—F.T.A. 2: 533, incl. *Cladosicyos* Hook. f.

Leaves smooth or nearly so on the lower surface, with a broad sinus and distant lobes at the base, 3–5-angled or more or less lobed, up to 15 cm. long and broad, acute, remotely denticulate; male flowers umbellate on a distinct long peduncle; fruit about 30 cm. long, 10 cm. in diam. .. .. 1. *edulis*

Leaves scabrid, thicker, with very narrow sinus and almost contiguous lobes at the base, often shortly lobed, about 12 cm. long, repand-denticulate; male flowers capitate on a rather short peduncle 3–4 cm. long; fruit about 8–6 cm. long 2. *mannii*

1. **C. edulis** (*Hook. f.*) *Cogn.* in DC. Monogr. 3: 518 (1881); Engl. Pflanzenr. Cucurbit. 1: 249, t. 58. *Cladosicyos edulis* Hook. f. in F.T.A. 2: 534 (1871). *Cucumeropsis mannii* of Chev. Bot. 293, not of Naud. *Momordica procera* of Chev. Bot. 291, name only. A strong climber; flowers yellow; fruit smooth, edible.
S.L.: *Daniel.* Mattru (Nov.) *Deighton* 2379! **Lib.:** Peáhtah (Oct.) *Linder* 1060! **Iv.C.:** Bouaké (July) *Chev.* 21123! Tébo (July) *Chev.* 19424! Bouroukrou (Jan.) *Chev.* 16795. Agboville (Nov.) *Chev.* 22387. **Dah.:** Abomey *Chev.* **N.Nig.:** *Barter* 1752! Abinsi *Dalz.* 738! **S.Nig.:** Lagos *Dawodu* 307! Aboh *Barter* 483! Aguku *Thomas* 672! Also in French Cameroons, Belgian Congo, Spanish Guinea and Angola. (See Appendix, p. 56.)

2. **C. mannii** *Naud.*—F.T.A. 2: 534; Cogn. in Engl. Pflanzenr. Cucurbit. 1: 249. Like the preceding.
S.Nig.: Calabar *Mann* (Hort. Paris)! Also in Gabon. (See Appendix, p. 56.)

19. PHYSEDRA Hook. f.—F.T.A. 2: 552.

Petiole pilose with long jointed hairs; nerves and veins pilose beneath; leaves digitately 6 7-lobed almost to the base, lobes more or less lanceolate, acutely acuminate, the middle one up to 17 cm. long; male flowers racemose on axillary peduncles, pedicels 5–15 mm. long; calyx lobes subulate 4–5 mm. long; corolla deeply lobed, nervose, lobes ovate, acute up to 5 cm. long and 3 cm. broad .. 1. *eglandulosa*

Petiole, and nerves and veins beneath, glabrous; leaves digitately 3–5-lobed to well beyond the middle or rarely a few quite entire, lobes long-tailed-acuminate, the middle one up to 14 cm. long, basal lobes almost contiguous; male flowers racemose on axillary peduncles, pedicels slender, 1·5–2 cm. long; calyx lobes subulate, up to 1 mm. long; corolla lobed almost to base, lobes lanceolate, up to 2 cm. long and 5 mm. broad .. .. 2. *longipes*

1. **P. eglandulosa** (*Hook. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1: 183 (1927); Kew Bull. 1928: 216. *Adenopus eglandulosus* Hook. f. in F.T.A. 2: 529 (1871); Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2: 231. *P. elegans* Harms & Gilg, partly, as to male specimens. *P. macrantha* Gilg (1904). *P. djalonis*, *P. ivorensis*, *P. sylvatica*, *Cephalandra ivorensis*, *C. sylvatica*, all of Chev. Bot. 294–5. A climber, up to 20 ft. or so; flowers yellow with purplish markings; fruit spherical, about 2 in. diam., bright red with yellow spots.
Fr.Sud.: Timbuktu *Chev.* **Fr.G.:** Kouria (July) *Chev.* 14942. **S.L.:** *Morson*! Port Loko (Sept.) *Addison*! Njala (fl. July, fr. Oct.) *Deighton* 1962! 2801! Mano (July) *Deighton* 2521! Bonthe (July) *Adames* 59! **Lib.:** Monrovia (July) *Linder* 34! Gbanga (Sept.) *Linder* 604! Brewersville (Sept.) *Barker* 1060! Fishtown (Oct.) *Dinklage* 1846. **Iv.C.:** *Scaëtta* 3305! Bouroukrou (Jan.) *Chev.* 16585! 16658! **G.C.:** Akwapim (Dec.) *Johnson* 514! Ogogo, Ashanti (May) *Williams* 270! Kwahu Plateau (May) *Kitson* 1187! **Togo:** Misahöhe (Apr.) *Baumann* 495. **N.Nig.:** *Yates* 40! **S.Nig.:** Lagos *Moloney*! Ajebandele (Apr.) *Tamajong* FHI 16935! (See Appendix, p. 63.)

2. **P. longipes** *Hook. f.* in F.T.A. 2: 553 (1871); Cogn. in DC. Monogr. 3: 525; Chev. Bot. 294, partly. A climber; corolla light orange yellow; fruit spherical, about 2 in. diam., brilliant scarlet when ripe.
Lib.: Gbanga (Sept.) *Linder* 469! Ganta (Sept.) *Harley*! Kondessu, Boporo *Baldwin* 10664! **Iv.C.:** Bouroukrou (Jan.) *Chev.* 16996! Tépos (Aug.) *Chev.* 19761. **G.C.:** Kumasi (July, Aug.) *Vigne* 3061! *Andoh* FH 4235! Begoro, Akim (Apr.) *Irvine* 1182! **Dah.:** Porto Novo (Jan.) *Chev.* **S.Nig.:** Sapoba (fr. Nov.) *Kennedy* 2630! *Meikle* 610! **F.Po:** (Nov.) *T. Vogel* 223! Also in French Cameroons, Gabon and Spanish Guinea.

20. BRYONOPSIS Arn.—F.T.A. 2: 556.

Slender, much-branched, leafy twiner, glabrous or nearly so; leaves very membranous, pedately lobed, 8–12 cm. diam., scabrid above, petiole 3–6 cm. long; male and female flowers in axillary fascicles, sometimes both sexes together; calyx lobes subulate, corolla about 1 cm. long; ovary glabrous; fruit globose 14–17 mm. diam., with longitudinal pale stripes .. .. *laciniosa*

B. laciniosa (*Linn.*) *Naud.*—F.T.A. 2: 185; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2: 160, t. 16 *Bryonia laciniosa* Linn. (1753). Flowers yellow; ripe fruits red with silvery white stripes.
F.Po: *Mildbr.* 7026. Also in S. Tomé, and widely distributed in tropical Africa, Asia and Australasia.

21. **PEPONIUM** Engl. in E. & P. Pflanzenfam. Nachtr. 318 (1897). *Peponia* Naud. (1866), not of Grev. (1863)—F.T.A. 2 : 526.

A monoecious climber ; branches villous with jointed many-celled hairs ; leaves digitately 5-lobed to about the middle, 5–10 cm. in diam., widely cordate at base, pilose on both surfaces, lobes ovate, sharply dentate ; petiole 1·5–2 cm. long, pilose ; tendrils branched, coiled above the fork ; male peduncles 1–3-flowered, with conspicuous obovate bracts ; calyx-lobes subulate, about 1 cm. long ; corolla gamopetalous, deeply lobed, puberulous on both sides, lobes ovate-oblong, up to 3 cm. long, acute, entire, nervose ; fruits ellipsoid, 7–8 cm. long, about 5 cm. thick, at length almost glabrous .. .. *vogelii*

P. vogelii (*Hook. f.*) *Engl.* in E. & P. Pflanzenfam. Nachtr. 318 (1897) ; Cogn. & Harms in Engl. Pflanzenr. Cucurbit. 2 : 214. *Peponia vogelii* Hook. f. in F.T.A. 2 : 526 (1871) ; Chev. Bot. 289. Flowers white or pale sulphur-yellow.
Dah.: Abomey (Feb.) *Chev.* 23163. **S.Nig.:** Lagos *Barter* 2169 ! *MacGregor* 336 ! **F.Po:** (Oct.) *T. Vogel* 8 ! Also in Belgian Congo, Tanganyika and Natal.

22. **RAPHIDIOCYSTIS** Hook. f.—F.T.A. 2 : 553.

Sepals pinnatipartite, segments subulate ; branches glabrous ; leaves more or less pentagonal in outline, deeply cordate at base with two short lateral lobes, acutely acuminate, 10–12 cm. long, slightly scabrid ; petioles about ½ as long as the leaves, slender, with golden-brown setae on the upper surface ; male and female flowers 2–3 in the leaf-axils ; male flowers shortly pedicellate, female with pedicels 2–7 cm. long ; ovary densely covered with stiff setae ; fruit ellipsoid, about 3 cm. long, densely setose, on short or long, slender peduncles .. .. .. 1. *mannii*

Sepals entire ; branches pubescent ; petioles only scabrid ; otherwise similar to above 2. *caillei*

1. **R. mannii** *Hook. f.* in F.T.A. 2 : 554 (1871) ; Cogn. in DC. Monogr. 3 : 527. Female flowers yellow ; male flowers dull orange ; fruits densely covered with rich-golden-brown stiff setae.
S.Nig.: Usonigbe F.R. (Jan.) *Richards* 3901 ! Sapoba (Nov.) *Ujor* FHI 23932 ! **Br.Cam.:** Victoria (fl. Feb., fr. Oct.) *Maitland* 373 ! 763 ! Buea to Mayuko (Feb.) *Dalz.* 8211 ! **F.Po:** 2,000 ft. (fl. & fr. Dec.) *Mann* 636 ! Also in French Cameroons.

2. **R. caillei** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 180 (1927) ; Kew Bull. 1928 : 215. *R. mannii* of Chev. Bot. 295, not of Hook. f.
Fr.G.: Kouria (Aug.) *Caille* in *Hb. Chev.* 15006 ! Bilima (Sept.) *Caille* in *Hb. Chev.* 15063 ! Nzérékoré to Macenta (fr. Oct.) *Baldwin* 9742 ! **S.L.:** Mano (fl. & fr. Jan.) *Deighton* 2446 ! Gbeseou, Njala (fr. Feb.) *Deighton* 4709 ! **Lib.:** Gbanga (fl. & fr. Sept.) *Linder* 633 ! R. Cess, Tchien (fl. & fr. Aug.) *Baldwin* 9009 !

23. **CUCURBITA** Linn.—F.T.A. 2 : 555.

Leaves distinctly lobed ; petioles and nerves of the leaves beneath clothed with rigid setae ; calyx-tube distinct, with linear not foliaceous lobes ; fruit mostly ellipsoid or obovoid and longer than broad, variously ribbed, smooth or verrucose, mostly with a coloured reticulation outside ; seeds with thickened margins .. 1. *pepo*

Leaves often scarcely lobed ; petioles and nerves beneath at most roughly scabrid ; calyx-tube short with linear or linear-lanceolate but not foliaceous lobes ; fruit often very large and depressed, globose, grooved ; seeds scarcely thickened on the margin 2. *maxima*

1. **C. pepo** *Linn.*—F.T.A. 2 : 556 ; Cogn. in DC. Monogr. 3 : 545. A large prostrate annual, with more or less angular stems ; flowers rich yellow. The Pumpkin, Vegetable Marrow, etc.
S.L.: Njala (July) *Deighton* 2782 ! Pendembu (July) *Thomas* 728 ! **G.C.:** Achimota *Irvine* 547 ! **N.Nig.:** Nupe *Barter* 1526 ! Katagum (Sept.) *Dalz.* 119 ! **S.Nig.:** Obu *Thomas* 362 ! Cultivated in all tropical and subtropical countries. (See Appendix, p. 57.)

2. **C. maxima** *Duchesne*—F.T.A. 2 : 555 ; Cogn. l.c. 544 ; Chev. Bot. 296. Annual, like the preceding, with more or less terete stems. The Squash Gourd, Melon Pumpkin, etc.
Fr.Sud.: Mande *Chev.* 2986. **Iv.C.:** Bouaké (July) *Chev.* 22137. Cultivated in all hot countries. (See Appendix, p. 57.)

24. **COCCINIA** Wight & Arn.—Cogn. in DC. Monogr. 3 : 528. *Cephalandra* Schrad.—F.T.A. 2 : 550.

Flowers (male and female) solitary ; calyx and corolla glabrous outside ; leaves very variable, pentagonal and shortly lobed to deeply 3–5-lobed, 5–10 cm. diam. ; fruit ellipsoid, about 5 cm. long and 2·5 cm. broad .. .. 1. *grandis*

Flowers (male and female) racemose ; calyx and corolla minutely puberulous outside ; leaves very variable, more or less deeply 3–5-lobed, 10–16 cm. diam. ; fruit ellipsoid, about 4 cm. long and 2 cm. broad .. .. 2. *barteri*

1. **C. grandis** (*Linn.*) *J. O. Voigt* Hort. Suburb. Calc. 59 (1845). *Bryonia grandis* Linn. (1767). *Cephalandra indica* Naud.—F.T.A. 2 : 550 ; Chev. Bot. 295. *Coccinia cordifolia* Cogn. in DC. Monogr. 3 : 529, partly ; F.W.T.A., ed. 1, 1 : 184, partly. *Coccinia moghadd* (Forsk.) Asch.—Cogn. in DC. Monogr. 3 : 531. *Cephalandra quinqueloba* of Chev. Bot. 295, not of Schrad. *Physedra gracilis* of Chev. Bot. 294.
Sen.: Richard Tol *Lelièvre.* Sor Isl. *Heudelot* 528 ! **N.Nig.:** Lokoja *Barter* ! Katagum (June, July, Nov.) *Dalz.* 113 ! 114 ! 115 ! Widespread in tropical Africa ; also in Arabia and abundant in India. (See Appendix, p. 55.)

2. **C. barteri** (*Hook. f.*) *Keay* in Kew Bull. 1953 : 82. *Staphylosyce barteri* Hook. f.—F.T.A. 2 : 555. *Physedra barteri* (Hook. f.) Cogn. in DC. Monogr. 3 : 525 ; F.W.T.A., ed. 1, 1 : 183. *Physedra elegans* Harms & Gilg, partly (female specimen). *Physedra heterophylla* of Chev. Bot. 294, partly, not of Hook. f. A climber, 15–20 ft. high ; flowers yellow.

S.L.: Falaba (Mar.) *Sc. Elliot* 5182 ! 5402 ! Yonibana (Oct., Nov.) *Thomas* 4280 ! 4979 ! Njala (fr. Nov.) *Deighton* 2410 ! Romeni, Kasse (Oct.) *Jordan* 359 ! **Iv.C.:** Toura country (May) *Chev.* 21636 ! Indenié (Dec.) *Chev.* 22628 *bis* ! **Togo:** Bismarckburg (Aug.) *Büttner* 704. **N.Nig.:** Nupe *Barter* 1525 ! **S.Nig.:** *Foster* 350 ! Gambari Group F.R. (Aug.) *Keay* FHI 16234 ! Okomu F.R. (Feb.) *Brenan* 9198 ! Oban *Talbot* 1419 ! **Br.Cam.:** Victoria (Feb.) *Dalz.* 8230 ! **F.Po:** *Mann* 199 ! 1166 ! Also in French Cameroons and Upper Congo. (See Appendix, p. 63.)

Imperfectly known species.

1. **C.** sp. **A.** Slender climber ; leaves deeply 3-lobed ; male flowers racemose ; calyx and corolla glabrous ; sepals long, subulate, reflexed ; female flowers and fruits not known.
   S.L.: Moyamba (Aug.) *Deighton* 2217 ! Bumban (Aug.) *Deighton* 1221 ! Jigaya (Sept.) *Thomas* 2844 ! **Lib.:** Du R. (July) *Linder* 121 !
2. **C.** sp. **B.** Herbaceous climber ; leaves more or less deeply 3-lobed ; male flowers racemose, calyx and corolla glabrous ; sepals flattened, erect ; fruit cylindrical " 8-in. long and $\frac{1}{2}$-in. diam." ; female flowers not known.
   G.C.: Nsuta (fl. & fr. May) *Vigne* 1735 ! **S.Nig.:** Grace Camp, Omo F.R. (May) *Tamajong* FHI 16938 ! A specimen from Liberia (*Linder* 576) may also belong here.
3. **C.** sp. **C.** Climbing or trailing herb ; flowers apricot coloured.
   N.Nig.: Jos *Hill* 53 ! Fiskin Mata (Apr.) *Lely* 105 ! Bichikki (May) *Lely* 175 !
4. **C.** sp. **D.** Herbaceous climber ; male flowers racemose.
   S.Nig.: Ibadan Forest (Dec.) *Punch* 46 !

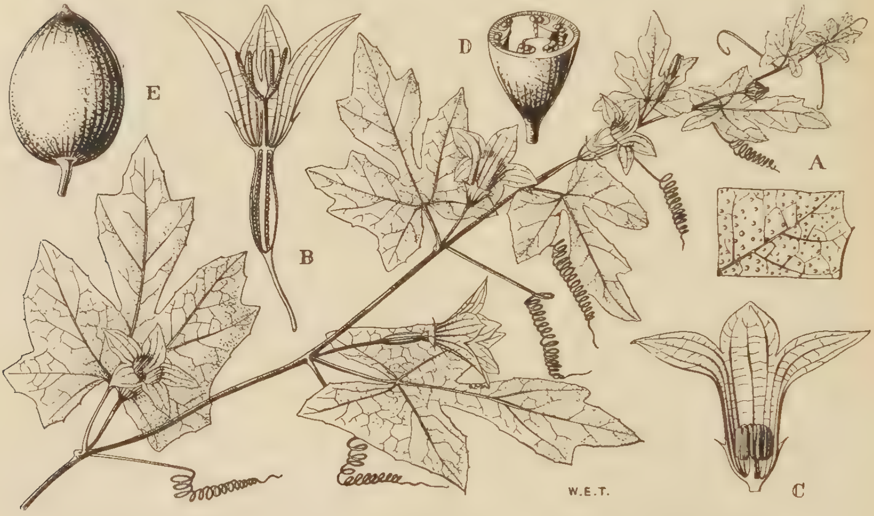

FIG. 85.—COCCINIA GRANDIS (*Linn.*) *J. O. Voigt* (CUCURBITACEAE).
A, under-surface of leaf. B, female flower in vertical section. C, male flower cut vertically. D, ovary in cross-section. E, fruit.

60. BEGONIACEAE

Herbs or undershrubs, mostly succulent. Leaves alternate, simple, often unequal-sided or oblique ; stipules free, deciduous. Flowers monoecious, actinomorphic or asymmetric, mostly in axillary cymes, showy. Male flower : sepals 2, opposite, rarely 5, valvate ; petals imbricate or absent ; stamens numerous, filaments free or connate, anthers 2-celled, continuous with the filament, opening lengthwise. Female flower : perianth more or less as in the male ; staminodes absent or very small ; ovary inferior, 2–4- (rarely 1-) celled, mostly angled or winged ; styles 2–5, free or connate ; stigmas often twisted, papillose all over ; ovules very numerous, on axile projecting simple or lobed placentas. Fruit a capsule or berry. Seeds minute and very numerous, with reticulate testa, scanty or no endosperm and straight embryo.

A well-marked, mainly tropical family ; herbaceous, mostly epiphytic, with stipulate often oblique leaves, unisexual flowers, inferior ovary and often winged fruit.

BEGONIA Linn.—F.T.A. 2 : 569.

Leaves peltate ; stems short, nodes crowded :
 Leaves bullate, with bristles on the upper surface :
  Ovary densely pilose ; leaves obliquely ovate-elliptic, very obtusely acuminate

7–12 cm. long, 5–7 cm. broad, serrulate and ciliate, with numerous radiating nerves ; petiole 4–5 cm. long, densely setose ; bracts broad, pectinate-ciliate ; male pedicels up to 1·5 cm. long ; stamens about 30 .. .. 1. *lacunosa*

Ovary glabrous :

Petiole densely long-setose, 6–15 cm. long ; leaves obliquely ovate-elliptic, 10–13 cm. long, 6–8 cm. broad ; bracts broad, pectinate-ciliate 2. *staudtii* var. *dispersipilosa*

Petiole glabrous, or nearly so, 4–11 cm. long ; leaves obliquely ovate-elliptic, acuminate, 8–11 cm. long, 5–7 cm. broad ; bracts small, pectinate-ciliate 3. *ficicola*

Leaves not bullate, usually glabrous above :

Ovary and fruit not winged :

Leaves obovate, somewhat narrowed towards base, doubly crenate ; peduncle shorter than the petioles ; stigma deeply 2-cleft :

Leaves not ciliate, subtruncate at base, oblong-elliptic, 6–13 cm. long, 3–7 cm. broad, prominently nervose beneath ; female peduncle about 2 cm. long in young fruit, slender .. .. 4. *schlechteri*

Leaves distinctly ciliate, rounded at base, broadly elliptic, 12–15 cm. long, 8–10 cm. broad ; female peduncle stout ; bracts persistent, ciliate .. 5. *laporteifolia*

Leaves obliquely ovate, 10–20 cm. long, 4–10 cm. broad, sinuate-denticulate, slightly ciliate towards the tips ; peduncle and petioles long ; stigma not 2-cleft 6. *scapigera*

Ovary and fruit winged :

Body of fruit about as broad as long, up to 1 cm. long and broad, wings short triangular ; leaves obliquely ovate, 8–13 cm. long, 4–6 cm. broad, obtuse at apex 7. *cilio-bracteata*

Body of fruit much longer than broad, 1·5–2 cm. long, wings long and broadest at or above the middle ; leaves ovate to suborbicular, acuminate or rounded at apex, up to 14 cm. long and 11 cm. broad .. .. 8. *quadrialata*

Leaves not peltate :

Leaves digitately 3- or more-lobed :

Leaves mostly regularly 5-lobed, 10–16 cm. diam. ; inflorescence shortly cymose, few-flowered ; fruit ellipsoid, not winged .. .. 9. *oxyloba*

Leaves irregularly 2–3-lobed, 3–5 cm. long, 2–4 cm. diam. ; flowers 2–3 together ; fruit fusiform, narrowly winged .. .. 10. *prismatocarpa*

Leaves not lobed :

Stems short, nodes crowded, petioles long, leaves in a rosette :

Leaves glabrous above :

Body of fruit about as broad as long, up to 1 cm. long and broad, wings short and triangular ; for other characters see above .. .. 7. *cilio-bracteata*

Body of fruit much longer than broad, about 1·5 cm. long, wings long and broadest at or above the middle ; leaves obliquely ovate, obtusely acuminate at apex, cordate at base, 7–11 cm. long, 6–9 cm. broad.. .. 11. *salisburyana*

Leaves long-setose above, obliquely ovate, triangular acuminate, 5–7 cm. long, 4–6 cm. broad ; petiole 3–12 cm. long ; ovary fusiform, narrowly winged 12. *pseudoviola*

Stems long ; internodes long, or if short then leaves not in a rosette :

Flowers in heads subtended by and partially enclosed in 2 large bracts forming a conical cup ; leaves scaly beneath :

Leaves very obliquely ovate with the 1–6 cm. long petiole apparently on one side of the lamina, acutely acuminate, not cordate, 12–18 cm. long, 6–11 cm. broad 13. *poculifera*

Leaves broadly ovate-orbicular, subequally cordate at base, abruptly caudate-acuminate, 15–20 cm. diam. ; petiole 12–20 cm. long .. .. 14. *ampla*

Leaves subobliquely elliptic, rounded at base, obtuse or subacute at apex, 9–16 cm. long, 3–6 cm. broad ; petiole 1–3 cm. long .. .. .. 15. *rhopalocarpa*

Flowers not in heads subtended by 2 large cupular bracts :

Flowers with 2 sepals (perianth segments) :

Petiole short, less than 3 cm. long, leaves more or less elliptic ; fruits broadly winged :

Petiole less than 5 mm. long, leaves unequally sided at base, 7–12 cm. long, 2·5–5 cm. broad, denticulate .. .. 16. *sessilifolia*

Petiole 1–2·5 cm. long, leaves obliquely cordate at base, 8–13 cm. long, 4–7 cm. broad, slightly dentate .. .. 17. *macrocarpa*

Petiole 4–12 cm. long ; leaves more or less ovate-triangular, 3–5 cm. long, 2–4 cm. broad ; fruit narrowly winged .. .. 10. *prismatocarpa*

Flowers with 3–6 sepals (perianth segments), usually with 4 :

*Fruit not fusiform, up to 1·5 cm. long, with 3 or 6 triangular wings ; leaves very obliquely ovate, cordate at base, acuminate at apex, margin rather coarsely and doubly serrate, up to 17 cm. long and 9 cm. broad ; petiole with a ring of setose hairs at the top :

Fruit with 3 wings, one 1–2·5 cm. long and triangular, the other two much shorter ; body of fruit 1–1·5 cm. long ; annual plant .. 18. *rostrata*

Fruit with 6 wings, 3 shortly triangular and about 3 mm. wide, the other 3 narrower, body of fruit about 6 mm. long .. .. .. 19. *annobonensis*

*Fruit fusiform, exceeding 1·5 cm. long, not winged, or with 3 narrow subequal wings ; mostly scandent perennial herbs with long stout stems :

Leaves linear-lanceolate, cuneate or obtuse at base, gradually acutely acuminate at apex, 5–10 cm. long, 7–17 mm. broad, entire, glabrous ; ovary glabrous ; fruit fusiform, sometimes narrowly winged .. .. .. 20. *polygonoides*

Leaves mostly ovate, or ovate-lanceolate, rarely lanceolate, exceeding 2 cm. broad, usually rounded or cordate at base at least on one side, often hairy beneath, margin often notched ; ovary glabrous or hairy :

Ovary and fruit 3-winged, glabrous ; styles 3 ; leaves oblong-ovate, obliquely cordate at the base, 9–11 cm. long, 3–4 cm. broad, margin denticulate, lamina rather thin .. .. 21. *fusialata*

Ovary and fruit not winged, usually hairy, often densely so :

Leaves lanceolate, 9–18 cm. long, 2–3·5 cm. broad, margin irregularly serrate, petiole up to 1 cm. long .. .. 22. *furfuracea*

Leaves ovate or ovate-lanceolate, exceeding 3·5 cm. broad :

Leaves not cordate at base, petiole often very long ; flowers and leaves often clustered towards the end of the creeping and rooting stem :

Male flowers densely clustered ; leaves oblong-elliptic, acuminate, 16–23 cm. long, 4–11 cm. broad, petiole 4–25 cm. long .. .. 23. *squamulosa*

Male flowers in lax cymes ; leaves oblong-elliptic, obtuse at apex, 8–20 cm. long, 4·5–9 cm. broad, petiole 2·5–12 cm. long .. .. 24. *fissicarpa*

Leaves cordate at base ; flowers and leaves not clustered towards the end of the stems :

Styles 2–3 :

Outer sepals 8–11 mm. long, 5–6 mm. broad ; male peduncle and pedicels very short ; female flowers usually solitary, ovary densely hairy ; fruit about 3·5 cm. long ; leaves ovate to oblong-ovate, obliquely cordate at base, 7–13 cm. long, 3–6 cm. broad, petiole 2–4 cm. long 25. *oxyanthera*

Outer sepals 5–8 mm. long, 3–4 mm. broad ; male peduncle and pedicels well developed ; female flowers usually 3 together ; fruit 2–3 cm. long ; leaves ovate to oblong-ovate, obliquely cordate at base, 8–14 cm. long, 3–7 cm. broad, petiole 3–8 cm. long .. .. 26. *eminii*

Styles 4 ; outer sepals 14–17 mm. long, 4–7 mm. broad ; female flowers usually 3 together on a common peduncle about 1 cm. long ; fruit 3–3·5 cm. long ; leaves ovate to oblong-ovate, gradually and acutely acuminate, cordate at base, often more or less obliquely so, 9–18 cm. long, 4–8 cm. broad, petiole 1–4 cm. long .. .. 27. *mannii*

1. **B. lacunosa** *Warb.* in Engl. Bot. Jahrb. 22 : 42 (1895) ; Engl. Pflanzenw. Afr. 3, 2 : 617 (1921). A creeping herb ; flowers white, pink at base.
S.Nig.: Oban *Talbot* ! **Br.Cam.**: Barombi *Preuss* 183 !

2. **B. staudtii** *Gilg* var. **dispersipilosa** Irmsch. in Engl. Bot. Jahrb. 76 : 214 (1954). Leaves pale green, bullate ; flowers bright yellow.
S.Nig.: Bende (Apr.) *Carpenter* 50*a* ! British Obokum waterfall (Dec.) *Keay* FHI 28279 ! Typical *B. staudtii* occurs in French Cameroons.

3. **B. ficicola** *Irmsch.* l.c. 213 (1954). Flowers yellow except for outside of one sepal, which is reddish-yellow.
Br.Cam.: Ekumbe Ndene waterfall, R. Meme (Dec.) *Dundas* FHI 20351 !

4. **B. schlechteri** *Gilg* in Engl. Bot. Jahrb. 34 : 93 (1904) ; Engl. l.c. 617. A low herb with short stem, creeping and ascending, and numerous fibrous roots.
Br.Cam.: between Mafura and Mundame (Jan.) *Schlechter* 12915 !

5. **B. laporteifolia** *Warb.* l.c. 22 : 41 (1895) ; Engl. l.c. 618. A creeping herb ; flowers white, pink at base.
Br.Cam.: Barombi *Preuss* 157 ; 563 ! Also in French Cameroons.

6. **B. scapigera** *Hook. f.* in F.T.A. 2 : 572 (1871) ; Engl. l.c. 618. Stemless, with a creeping woody rootstock ; flowers borne on long leafless scape.
Br.Cam.: Rio del Rey *Johnston* ! Buea *Preuss* 952 ! Cam. Mt., 4,000 ft. (Dec.) *Mann* 1946 !

7. **B. cilio-bracteata** *Warb.* l.c. 22 : 40 (1895) ; Engl. l.c. 616 (as *B. ciliato-bracteata* Warb.). Herb with short creeping stem ; leaves sometimes peltate ; inflorescences shorter than petioles ; sepals white, one with red markings inside.
G.C.: Prestea (July) *Vigne* 1263 (partly) ! Mamiri F.R. (Apr.) *Andoh* FH 5020 ! **Br.Cam.**: Mungo Ndaw to Ntale, Kumba (Oct.) *Dundas* FHI 15325 ! Also in French Cameroons and Spanish Guinea.

8. **B. quadrialata** *Warb.* l.c. 22 : 43 (1895) ; Engl. l.c. 617. *B. whytei* Stapf (1905) ; Engl. l.c. ; Chev. Bot. 299. *B. calabarica* Stapf (1906) ; Engl. l.c. ; F.W.T.A., ed. 1, 1 : 187. *B. modesta* Stapf (1908) ; F.W.T.A., ed. 1, 1 : 187. Herb with short stem ; petiole and peduncles pink ; leaves pale green, rather darker above, with pink or reddish margin ; upper sepal orange-red outside, yellow streaked orange-red within, lower sepal yellow sometimes slightly tinged red ; in forest, by streams.
Fr.G.: foot of Mt. Nzo (Mar.) *Chev.* 21082. **S.L.**: Kenema (Jan.) *Bowden* ! Gola Forest (Jan.) *King* 117*b* ! **Lib.**: Gola Forest (May) *Bunting* ! Sinoe Basin *Whyte* ! Duo, Sinoe (Mar.) *Baldwin* 11351 ! Vonjama (Nov.) *Baldwin* 10024 ! **Iv.C.**: foot of Mt. Nouba (Apr.) *Chev.* 21126 ! **G.C.**: Ancobra R. (Dec.) *Johnson* 980 ! Near Tarkwa (Apr.) *Chipp* 197 ! Brumase (Jan.) *Irvine* 1080 ! Near Prestea (Sept.) *Vigne* 3073 ! **S.Nig.**: Enugu (Feb.) *Jones* FHI 710 ! Afi River F.R. (May, Dec.) *Jones* FHI 5809 ! *Keay* FHI 28188 ! Near Calabar (Dec.) *Burtt* B.1 ! **Br.Cam.**: Barombi (Apr.–June) *Preuss* 119 ; 185 ; 186 ; 319. Also in French Cameroons.

9. **B. oxyloba** *Welw. ex Hook. f.* in F.T.A. 2 : 573 (1871) ; Engl. l.c. 614 ; Chev. Bot. 298. *B. conrauii* Gilg (1904). *B. togoensis* Gilg (1904). *B. sassandrensis* A. Chev. (1912). More or less erect succulent herb, 1–2 ft. high, with long woody rootstock, older plants straggling ; stems tinged pink ; leaves purplish beneath ; flowers pale pink with darker veins ; fruits green with pink veins and white spots.

Fr.G.: Macenta (Oct.) *Baldwin* 9807 ! And *fide* Chev. *l.c.* **S.L.:** near Freetown (Aug.) *Kelsall* ! **Lib.:** Sanokwele (Sept.) *Baldwin* 9544 ! **Iv.C.:** Mt. Do, Dyolas (May) *Chev.* 21417 ! And other localities *fide* Chev. *l.c.* **G.C.:** Begoro (Dec.) *Johnson* 819 ! Fwirem, Ashanti (May) *Chipp* 456 ! Pamu-Berekum F.R. (Sept.) *Vigne* 2495 ! **Togo:** Amedzoive (fl. & fr. July) *Baumann* 419. **S.Nig.:** Idanre (Oct.) *Keay* FHI 22675 ! **Br.Cam.:** Cam. Mt., 4,000 ft. (Jan., Feb., Nov.) *Mann* 1274 ! *Dunlap* 17 ! *Preuss* 995 ! **F.Po:** 3,000 ft. (Dec.) *Mann* 562 ! Extends to Uganda, Tanganyika and Angola.

10. **B. prismatocarpa** *Hook.*—F.T.A. 2 : 573 ; Engl. l.c. 618 ; Chev. Bot. 298. *B. petraea* A. Chev. (1912). A slender dwarf plant ; stem branched, creeping and rooting ; flowers yellow or pinkish-white ; an epiphyte on trees, on rocks, etc.

Iv.C.: Grabo (July) *Chev.* 19596. **Br.Cam.:** Basosi, Kumba (Oct.) *Dundas* FHI 15329 ! **F.Po:** 3,000 ft. (Aug., Dec.) *Barter* 2047 ! *Mann* 563 ! Ureka (Aug.) *Thorold* TF 79*a* ! Musola (Jan.) *Guinea* 1410 !

11. **B. salisburyana** *Irmsch.* l.c. 215 (1954). Acaulescent herb ; leaves very pale green, petioles dull red-purple ; one sepal yellow, the other red with yellowish streaks.

S.Nig.: Okomu F.R. (fl. & fr. Dec.) *Brenan* 8432 ! 8531 ! *Richards* 3126 ! 3346 ! *Ross* 236 !

12. **B. pseudoviola** *Gilg* in Engl. Bot. Jahrb. 34 : 88 (1904) ; Engl. l.c. 616. An almost stemless herb, petioles and under surface of leaves crimson, upper surface dark green ; flowers yellow with crimson markings.

Br.Cam.: Widdekum (Jan.) *Keay* FHI 28342 ! Banti to Babesong (Nov.) *Conrau* 10.

13. **B. poculifera** *Hook. f.* in F.T.A 2 : 574 (1871) ; Engl. l.c. 614. An epiphyte with stout climbing stem several feet in length ; bracts green, sepals white with red veins at base.

S.Nig.. Oban *Talbot* 589 ! 590 ! Ikwette Plateau, Obudu (Dec.) *Keay & Savory* FHI 25244 ! **Br.Cam.:** *Preuss* 883 ! Cam. Mt., 4,000–7,000 ft. (Mar., Apr., Nov., Dec.) *Mann* 1276 ! *Maitland* 898 ! *Brenan* 9388 ! **F.Po:** 2,000 ft. (Nov.) *Mann* 561 ! L. Moka, 6,000 ft. (Jan.) *Exell* 800 ! 801 !

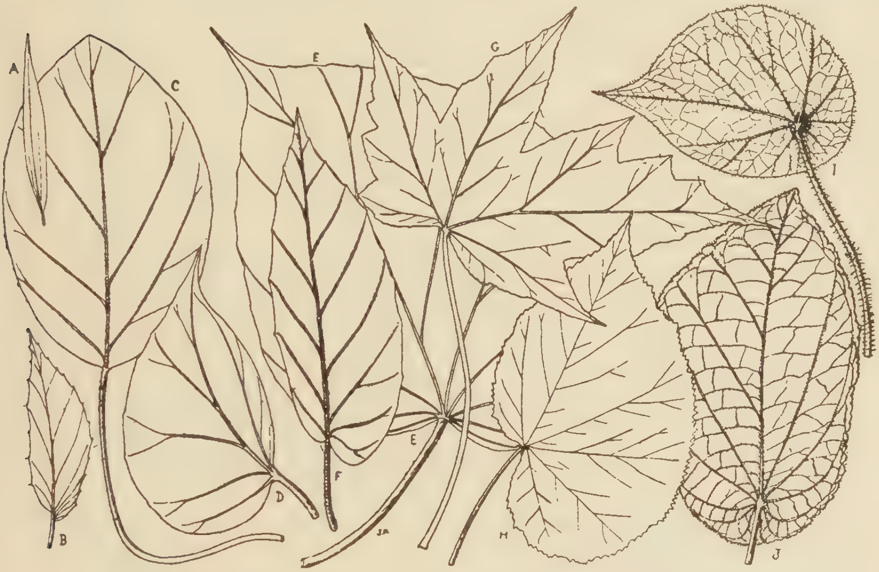

FIG. 86.—LEAVES OF BEGONIA (BEGONIACEAE).

A, *B. polygonoides* Hook. f. B, *B. macrocarpa* Warb. C, *B. fissicarpa* Irmsch. D, *B. poculifera* Hook. f. E, *B. ampla* Hook. f. F, *B. mannii* Hook. f. G, *B. oxyloba* Welw. ex Hook. f. H, *B. rostrata* Welw. ex Hook. f. I, *B. quadrialata* Warb. J, *B. laporteifolia* Warb.

14. **B. ampla** *Hook. f.* in F.T.A. 2 : 574 (1871) ; Engl. l.c. 614. Exell Cat. S. Tomé 187. An epiphyte with stout woody stem ; inflorescence with 2 large green bracts forming a cup enclosing the flowers ; sepals white or pinkish, with red lines.

Br.Cam.: Kumba—Mamfe Road (July) *Tamajong* FHI 23451 ! Basosi, Kumba (Oct.) *Dundas* FHI 15327 ! Barombi *Preuss* 447 ! **F.Po:** 1,000–2,000 ft. *Mann* 314 ! Also in French Cameroons, Principe, S. Tomé, Annobon and Uganda.

15. **B. rhopalocarpa** *Warb.* in Engl. Bot. Jahrb. 22 : 40 (1895) ; Engl. l.c. 614. Epiphyte with long stem.

Br.Cam.: Bibundi (July) *Dusen* 89. Also in French Cameroons and Belgian Congo.

16. **B. sessilifolia** *Hook. f.* in F.T.A. 2 : 577 (1871) ; Engl. l.c. 616. Stem slender, simple or branched, 1–2 ft., flowers white.

F.Po: 1,000–2,000 ft. (Nov.) *Mann* 564 ! Balacha to Ureka (Feb.) *Guinea* 2294 ! Also in French Cameroons.

17. **B. macrocarpa** *Warb.* l.c. 22 : 43 (1895) ; Engl. l.c. 616. *B. pseudoimpatiens* Gilg (1904). *B. simii* Stapf (1905). *B. gouroana* A. Chev. (1912)—F.W.T.A., ed. 1, 1 : 188. An erect succulent herb creeping at the base, stem often red-purple ; sepals white with red base, or pink to purple.

Fr.G.: Konanké country (Feb.) *Chev.* 20817 ! **S.L.:** Makomba (Feb.) *Deighton* 4080 ! Kulafaga to Bendugu (Sept.) *Deighton* 5144 ! **Lib.:** Sinoe Basin *Whyte* ! Kakatown *Whyte* ! Vonjama (Oct.) *Baldwin* 10034 ! Sanokwele (Sept.) *Baldwin* 9532 ! Gletown (July) *Baldwin* 6751 ! **Iv.C.:** Oua to Gouro, Upper Cavally (Apr.) *Chev.* 21348 ! **G.C.:** Tarkwa (Dec.) *Johnson* 981 ! Begoro (Apr.) *Irvine* 1191 ! **S.Nig.:** Shasha F.R. (May) *Richards* 3498 ! Nikrowa (Dec.) *Brenan* 8399 ! Afi River F.R. (May) *Jones* FHI 5808 ! **Br.Cam.:** Barombi (May) *Preuss* 200. Bakebe, Mamfe (Sept.) *Eyeku* FHI 22314 ! Banti to Babesong (Nov.) *Conrau* 5. Also in French Cameroons.

18. **B. rostrata** *Welw. ex Hook. f.* in F.T.A. 2 : 578 (1871) ; Engl. l.c. 615 ; Chev. Bot. 298. *B. chevalieri* Warb. ex A. Chev. (1912) ; Chev. Bot. 297 ; F.W.T.A., ed. 1, 1 : 188. *B. elliotii* Gilg ex Engl. l.c. 620. Fleshy annual ; variable in size according to habitat, from a few inches to 3 ft. high ; stem and petiole tinged pink, leaves pale green with white or pink marking ; flowers white or pale pink.

Fr.Sud.: Koulikoro (Oct.) *Chev.* 2997! **Fr.G.**: Macenta (Oct.) *Baldwin* 9852! Ditinn (Sept.) *Chev* 18537. **S.L.**: Regent (fr. Dec.) *Sc. Elliot* 3983! Rokupr (Oct.) *Jordan* 141! Roruks (Aug.) *Deighton* 5339! **Lib.**: Mt. Bobei, Sanokwele (Sept.) *Baldwin* 9608! **Iv.C.**: Toura country (May) *Chev.* 21599! **G.C.**: Kwahu (fl. & fr. Nov.) *Brown* 779! **Togo**: Misahöhe Pass (fl. & fr. Oct.) *A. S. Thomas* K. 11! **N.Nig.**: Patti Lokoja (fl. & fr. Nov.) *Dalz.* 193! Birnin Gwari (fr. Dec.) *Meikle* 1587! Mada Hills *Hepburn* 84! **S.Nig.**: Idanre Hills (fl. & fr. Oct.) *Keay* FHI 25500! Also in Angola.

19. **B. annobonensis** *A.DC.*—F.T.A. 2: 578; Engl. l.c. 618; Exell Cat. S. Tomé 187. *B. quintasii* C.DC.—F.W.T.A., ed. 1, 1: 188. Erect epiphyte, sepals white tinged pink, ovary white with red wings.
Br.Cam.: Rio del Rey *Johnston*! Victoria (Sept.) *Dundas* FHI 15319! Also in Principe, S. Tomé and Annobon.

20. **B. polygonoides** *Hook. f.* in F.T.A. 2: 571 (1871); Engl. l.c. 618; Chev. Bot. 298. *B. epilobioides* Warb. (1895). *B. rhipsaloides* A. Chev. (1912)—F.W.T.A., ed. 1, 1: 187. Epiphyte with long flexuous pendant stems.
Fr.G.: Macenta (Oct.) *Baldwin* 9851! **Lib.**: Zuie, Boporo (Nov.) *Baldwin* 10261! **Iv.C.**: Dyola country *Chev.* 21183. **S.Nig.**: Oban *Talbot* 1740! Calabar *Thomson* 74! **Br.Cam.**: *Dusen.* Also in French Cameroons and Belgian Congo.

21. **B. fusialata** *Warb.* l.c. 22: 37 (1895); Engl. l.c. 620. Sub-epiphyte creeping over logs, etc., in forest, often rooting at the nodes; flowers pink; fruit red.
G.C.: Mt. Ejuanema, 2,500 ft. (fl. & fr. Apr.) *N. F. Robertson* 116! **S.Nig.**: Essuasu (Dec.) *Miles* 5! **Br.Cam.**: *Dusen* 71. Also in French Cameroons.

22. **B. furfuracea** *Hook. f.* in F.T.A. 2: 571 (1871); Engl. l.c. 618. Epiphyte, 3 ft. high; flowers white and red.
F.Po: 1,300 ft. *Mann* 304!

23. **B. squamulosa** *Hook. f.* in F.T.A. 2: 579 (1871); Engl. l.c. 620. *B. longipetiolata* Gilg l.c. 92 (1904); F.W.T.A., ed. 1, 1: 188.
S.Nig.: Oban *Talbot* 1741! **Br.Cam.**: Cam. Mt., *Kalbreyer* 155! Also in French Cameroons and Spanish Guinea.

24. **B. fissicarpa** *Irmsch.* l.c. 212 (1954). *B. rubro-marginata* of F.W.T.A., ed. 1, 1: 188, not of Gilg.
S.L.: *Deighton* 709! Makunde, Limba (Apr.) *Sc. Elliot* 5721! Falaba (Apr.) *Aylmer* 49! **Lib.**: Mt. Barclay (May) *Bunting* 27! Kulo, Sinoe (fl. & fr. Mar.) *Baldwin* 11417! **G.C.**: (Feb.) *Johnson* 129! (See Appendix, p. 64.)

25. **B. oxyanthera** *Warb.* l.c. 22: 35 (1895). A climbing shrub with stems reaching 20–30 ft.; flowers red and white.
Br.Cam.: Buea (Mar.) *Preuss* 867! Bafut-Ngemba F.R., Bamenda (Apr.) *Ujor* FHI 30010! Also in French Cameroons.

26. **B. eminii** *Warb.* in Engl. Pflanzenw. Ost-Afr. C: 282 (1895); Engl. l.c. 620. *B. preussii* Warb. in Engl. Bot. Jahrb. 22: 36 (1895); F.W.T.A., ed. 1, 1: 188. *B. macrostyla* Warb. l.c. 37. *B. warburgii* Gilg in Engl. Bot. Jahrb. 34: 94 (1904). *B. alepensis* A. Chev. (1912)—F.W.T.A., ed. 1, 1: 188. *B. cavallyensis* A. Chev. (1912)—F.W.T.A., ed. 1, 1: 188. A branched, scrambling epiphyte; rooting at nodes; flowers pinkish or red; fruit scarlet, rarely white.
Lib.: Vonjama (Oct.) *Baldwin* 9906! **Iv.C.**: R. Me, Alépe (Mar.) *Chev.* 17482. Mt. Do (May) *Chev.* 21422. **G.C.**: Anyinam (Oct.) *Fishlock* 60! Kibbi Hills (Dec.) *Johnson* 508! Kwahu Prasu (Feb.) *Vigne* 1600! **S.Nig.**: Oban *Talbot*! Afi River F.R. (May) *Jones* FHI 5835! **Br.Cam.**: Mopanya *Kalbreyer* 96! Buea (Sept., Nov.) *Preuss* 960! *Migeod* 221! Elephant Lake, Barombi *Preuss* 111! **F.Po**: Moka (Feb.) *Exell* 858! Widespread in the forests of tropical Africa.

27. **B. mannii** *Hook.* Bot. Mag. t. 5434 (1864); F.T.A. 2: 570. *B. excelsa* Hook. f. in F.T.A. 2: 571 (1871); F.W.T.A., ed. 1, 1: 187. *B. epiphytica* Hook. f. l.c. 580 (1871); F.W.T.A., ed. 1, 1: 188. Scrambling epiphyte.
S.L.: Daru, Tunkia (Oct.) *Fisher* 83! **S.Nig.**: Shasha F.R. (Apr.) *Ross* 3336! Usonigbe F.R. (Nov.) *Keay* FHI 25623! Aboabam (fl. & fr. Dec.) *Keay* FHI 28178! Oban *Talbot* 460! 1541! Old Calabar (fl. & fr. Feb.) *Mann* 2317! *Thomson* 23! **Br.Cam.**: Cam. Mt., 4,000 ft. (fl. & fr. Feb.) *Mann* 1275! **F.Po**: 1,000–2,000 ft. (Dec.) *Mann* 311! 565! Also in French Cameroons. (See Appendix, p. 64.)

In addition to the above the following species, authentic material of which I have not seen, have been recorded from our area. Most of these species belong to Sect. Fusibegonia, the key to which in Engl. Pflanzenw. Afr. 3, 2: 618 (1921) is most unsatisfactory.

1. **B. microsperma** *Warb.* in Engl. Bot. Jahrb. 22: 42 (1895).
Cameroons—without locality *Dusen* 79.
2. **B. dusenii** *Warb.* l.c. 44 (1895).
Cameroons—without locality *Dusen* 90.
3. **B. jussiaecarpa** *Warb.* l.c. 33 (1895).
Br.Cam.: Cam. Mt., 4,500 ft. *Dusen* 427.
4. **B. sessilanthera** *Warb.* l.c. 34 (1895).
Br.Cam.: Victoria to Bimbia (May) *Preuss* 1261.
5. **B. macrura** *Gilg* in Engl. Bot. Jahrb. 34: 92 (1904).
Br. Cam.: Mafura to Mundame (Jan.) *Schlechter* 12918. Also in French Cameroons.
6. **B. rubromarginata** *Gilg* l.c. 34: 95 (1904).
Br.Cam.: Bangwa *Conrau* 80.
7. **B. gilgii** *Engl.* Pflanzenw. Afr. 3, 2: 616 (1921); Mildbr. Wiss. Ergebn. 2: 188 (1922).
F.Po: *Mildbr.* 6287.
8. **B. gladiifolia** *Engl.* l.c. 619 (1921); Mildbr. l.c. 188.
F.Po: Peak of St. Isabel, 1,900–2,600 ft. *Mildbr.* 6394.
9. **B. hookeriana** *Gilg ex Engl.* l.c. 617 (1921).
Br.Cam.: Cam. Mt. *Dusen.*
10. **B.** sp. *Mildbr.* l.c. 188, as *B. macropoda* Gilg (?), sterile.
F.Po: *Mildbr.* 6290.

61. CARICACEAE

Small trees or shrubs with a terminal cluster of leaves and milky juice; leaves alternate, often variously digitately lobed or foliolate; stipules absent; flowers hermaphrodite and unisexual, racemose; male flower: calyx 5-lobed, small; petals united into a slender tube; lobes contorted or valvate; stamens 10, inserted on the corolla; filaments free or connate at the base; anthers 2-celled, opening lengthwise; rudimentary ovary present or absent; female flower: calyx of the male; petals at first connivent, at length free; no staminodes; ovary superior, sessile, 1-celled or spuriously 5-celled, with parietal placentas;

ovules numerous ; style short or absent ; fruit a pulpy berry ; seeds with fleshy endosperm and straight embryo.

A small family, mainly of tropical America, with only one genus in Africa.

Carica papaya Linn., the Pawpaw, is very widely cultivated in our area and is sometimes subspontaneous.

CYLICOMORPHA Urb. in Engl. Bot. Jahrb. 30 : 115 (1901).

Trees with very soft wood and copious milky juice, stem prickly ; leaves in a cluster at the top of the stem, palmately lobed, petioles long ; inflorescences axillary ; male flowers numerous, paniculate ; female flowers solitary or in short few-flowered inflorescences ; stamens connate into a tube at the base ; corolla lobes alternating with the calyx teeth ; fruit a 5-gonous berry.

Straight tree with hollow stem ; leaves and stem glabrous ; petioles 12–45 cm. long ; lamina deeply 5-lobed, 7–9-nerved at base, 20–45 cm. diam., lobes more or less obovate, acuminate, 6–10 cm. broad, basal lobes oblique and sometimes themselves lobed ; male flowers densely puberulous, in puberulous panicles made up of several 3–9-flowered cymes ; calyx of male flower campanulate, 5–6 mm. long, 4·5–5 mm. diam., subtruncate at apex and remote from the corolla tube ; corolla 4·5–5 cm. long, with lobes about 1·5 cm. long ; female flowers not known ; fruit ovoid, 5-gonous, 3–4·5 cm. long, about 2 cm. diam. ; seeds numerous, ellipsoid, about 5 mm. long, with ruminate markings .. .. *solmsii*

C. **solmsii** (*Urb.*) *Urb.* in Engl. Bot. Jahrb. 30 : 115 (1901). *Jacartia ? solmsii* Urb. in Engl. Bot. Jahrb. 15 : 158 (1892). Tree, to 80 ft. high, resembling the Pawpaw but with short sharp conical prickles on the stem ; flowers yellow or cream ; fruit yellow.
Br.Cam.: Buea Road (Jan.) *Maitland* 1281 ! Bulifambo, Buea (Mar.) *Maitland* 574 ! Elephant Lake, Kumba (Sept.) *Preuss* 489 ! Tingo, by R. Ife, Wum (fr. July) *Ujor* FHI 30469 !

62. CACTACEAE

Succulent herbs and shrubs of diverse habit, often very spiny, and usually with much reduced leaves. Flowers hermaphrodite, actinomorphic, often handsome, but very small in the African species (*Rhipsalis*). Calyx-tube adnate to the ovary and often produced beyond ; lobes few to many, or reduced to minute teeth. Petals 6 or more. Stamens numerous, free or adnate to the base of the petals. Ovary inferior, 1-celled, with parietal many- or rarely few-ovuled placentas ; stigma usually radiate. Fruit baccate, many-seeded. Seeds mostly without endosperm.

Exclusively an American family except for *Rhipsalis*. Recognized by the habit and epigynous flowers. Besides *Rhipsalis* some species of *Opuntia* are naturalized in the coast regions.

RHIPSALIS Gaertn.—F.T.A. 2 : 581.

Calyx-teeth very short, 3 or more. Petals 6–10, spreading, oblong. Stamens about 20. Ovary inferior, glabrous. Seeds without endosperm.

An epiphytic shrub or on rocks ; branches cylindrical, fleshy, articulated and sometimes rooting at the nodes, dichotomously branched or subverticillate, glabrous ; leaves scale-like, soon falling off ; flowers white, small, sessile ; calyx minute ; berries yellowish-white like mistletoe, with viscous pulp and black shining seeds *cassutha*

R. **cassutha** *Gaertn.*—F.T.A. 2 : 581, including var. *tenuior* Oliv. *R. guineensis* of Chev. Bot. 299.
S.L.: Benduma, Mongeri *Deighton* 2222 ! Keyeima (Mar.) *Deighton* 3222 ! **Iv.C.** : various localities *fide* Chev. *l.c.* **G.C.:** Koforedua (fr. Apr.) *Vigne* 4379 ! **S.Nig.:** Uregin (July) *Unwin* 116 ! Akure F. R. *Jones* FHI 19530 ! Sapoba *Kennedy* 1365 ! **Br.Cam.:** Nyasaso, Tombel *Thorold* 73 ! **F.Po** : *Mann* 1419. Widely distributed in the tropics.

63. OCHNACEAE

Trees or shrubs with watery juice, rarely herbs. Leaves alternate, simple, very rarely pinnate, often with numerous pinnate nerves ; stipules present, sometimes laciniate. Flowers hermaphrodite, actinomorphic, mostly racemose or paniculate. Sepals 4–5, rarely 10, free, imbricate or rarely contorted. Petals free, 4–10, subsessile, contorted or imbricate. Stamens few to many, free ; staminodes sometimes present, subulate or petaloid, sometimes connate into a tube ; filaments persistent ; anthers linear, basifixed, opening lengthwise or by terminal pores. Ovary entire to deeply lobed, 1–10-celled ; ovules 1 to many, axile or parietal or attached to the intrusive placentas ; style simple or divided at the apex. Fruiting carpels often becoming quite separate on the enlarged torus and drupaceous, or elongated capsular and septicidal. Seeds 1 to many, with or without endosperm ; embryo usually straight.

Mostly a tropical family, with stipulate leaves usually with prominent numerous lateral nerves ; ovary usually very deeply lobed with a simple style ; fruiting carpels often quite separate on the enlarged torus ; calyx persistent in fruit.

Trees, shrubs or undershrubs, without pectinate stipules ; staminodes absent :

Fruiting carpels becoming separate, black and drupaceous, on an enlarged torus ; sepals persistent and often red or pink in fruit :

Stamens numerous ; filaments often as long as or longer than the anthers, the latter dehiscing longitudinally or by pore-like slits .. .. **1. Ochna**

Stamens 10 ; filaments much shorter than the anthers, the latter opening by apical pores .. .. **2. Ouratea**

Fruit a nut or capsule :

Sepals unequally enlarged and wing-like in fruit, the latter a nut ; ovary 1-celled with a basal placenta ; stamens numerous .. .. .. **3. Lophira**

Sepals caducous after flowering ; fruit a dehiscent capsule with numerous winged seeds ; ovary 5-celled with axile placentation ; stamens 5 .. **4. Fleurydora**

Herbs with persistent pectinate stipules ; stamens 5, accompanied by staminodes in two rows, the inner petaloid, the outer filiform ; ovary entire with parietal placentation ; fruit a 3-valved septicidal capsule .. .. **5. Sauvagesia**

1. OCHNA Linn.—F.T.A. 1 : 316.

Inflorescence (leafless part above bud-scale scars) branched, composed of few-flowered cymes on the central axis ; anthers opening by pores ; leaves elliptic to oblanceolate, acuminate at apex, 5–12 cm. long, 1·5–4·5 cm. broad .. .. 1. *membranacea*

Inflorescence simple, racemose or fasciculate ; anthers opening by pores or longitudinal slits :

Inflorescence racemose with the axis more than 1·5 cm. long ; anthers opening by longitudinal slits :

Pedicels articulated at the very base, or within 2 mm. from the base, leaving very short " pegs " on the axis after falling ; style divided at the apex 2. *mannii*

Pedicels articulated 2–6 mm. from the base, leaving long " pegs " on the axis after falling .. .. 3. *multiflora*

Inflorescence fasciculate, or racemose with the axis less than 1·5 cm. long, often only 1–3 mm. :

Sepals in fruit 2–3 cm. long ; carpels ellipsoid, about 1 cm. long ; flowers solitary or paired ; leaves elliptic-lanceolate, acutely acuminate, 12–18 cm. long, 3–6 cm. broad ; lateral nerves not very numerous, rather distant, equally prominent on both surfaces .. .. 4. *kibbiensis*

Sepals in fruit less than 1·5 cm. long :

Pedicels articulated more than 2 mm. from the base ; anthers opening by pores ; leaves oblong-elliptic to ovate, 1·5–4 cm. long, 1–2 cm. broad .. 5. *ovata*

Pedicels articulated less than 2 mm. from the base ; anthers opening by longitudinal slits ; leaves much exceeding 4 cm. long :

Branchlets dark brown with conspicuous lenticels ; leaves elliptic to oblanceolate, acute at apex or shortly and obtusely acuminate, 6–12 cm. long, 2–3·5 cm. broad; flowers white .. .. 6. *afzelii*

Branchlets grey or pale brown with exfoliating bark ; leaves obovate to oblanceolate, rounded or emarginate at apex ; flowers yellow :

Small tree ; leaves 8–15 cm. long, 3–7 cm. broad ; pedicels 2·5–3 cm. long in fruit 7. *schweinfurthiana*

Low shrub ; leaves 4–10 cm. long, 1·2–3·5 cm. broad ; pedicels 1·2–2·5 cm. long in fruit .. .. 8. *rhizomatosa*

1. **O. membranacea** *Oliv.* F.T.A. 1 : 316 (1868) ; Gilg in Engl. Bot. Jahrb. 33 : 234 (1903). *Porochna membranacea* (Oliv.) Van Tiegh. in Journ. de Bot. 16 : 124 (1902). *Diporochna membranacea* (Oliv.) Van Tiegh. in Ann. Sci. Nat. 8, 16 : 390 (1902). *D. oliveri* Van Tiegh. l.c. 390 (1902). *Ouratea elegans* of Chev. Bot. 108, partly. *Ouratea elegans* of Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 190 and ih Kew Bull. 1928 : 216, partly, not *Monelasmum elegans* Van Tiegh. l.c. 329 (1902). *Ochna smythei* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 190 ; Kew Bull. 1928 : 216. *Ochna barteri* of F.W.T.A., ed. 1, 1 : 190, partly, not *Ochnella barteri* Van Tiegh. in Journ. de Bot. 16 : 122 (1902). A glabrous shrub or small tree, to 24 ft. high ; flowers yellow ; fruits black, surrounded by red sepals.

Fr.G.: Los Isl. (May) *Pobéguin* 1179 ! 1180 ! **S.L.:** Sugar Loaf Mt. (May) *Barter* ! Heirakohun *Smythe* 124 ! Kambia (May) *Jordan* 442 ! **Iv.C.:** Mt. Pon (Mar.) *Aubrév.* 1063 ! Mt. Do, Dyolas (May) *Chev.* 21426 ! **G.C.:** Achimota (fl. & fr. Apr., May) *Howes* 1167 ! *Irvine* 276 ! 1608 ! Ijang F.R. (fr. Apr.) *Williams* 278 ! **Togo:** Lome *Warnecke* 83 ! **Dah.:** Atacora Mts. (June) *Chev.* 24165. **N.Nig.:** Idah *Barter* 1643 ! **S.Nig.:** Eggua F.R. (Apr.) *Akinlade* FHI 15016 ! Olokemeji (May) *A. F. Ross* 165 ! Udi (fr. Mar.) *Chesters* 2 ! **Br.Cam.:** Fang, Bamenda (Apr.) *Maitland* 1477 ! Also in Ubangi-Shari and Belgian Congo.

2. **O. mannii** *Van Tiegh.* in Journ. de Bot. 16 : 121 (1902) ; Chev. Bot. 106. *O. multiflora* of F.T.A. 1 : 317, partly. A shrub about 12 ft. high.
Dah.: Cotonou (Mar.) *Chev.* 23368 ! **S.Nig.:** Nun R. (Sept.) *Mann* 490 !

3. **O. multiflora** *DC.*—F.T.A. 1 : 317 (excl. spec. *Mann*) ; Gilg l.c. 233. *O. palisotii*, *O. fragrans* and *O. tenuipes* all of Van Tiegh. in Ann. Sci. Nat. 8, 16 : 384–385 (1902). A glabrous shrub or small tree, flowering in mass about Feb.–Mar. ; petals fugacious ; calyx wine-red in fruit ; often near water.
Gam.: *Perrottet* 100 ! **Fr.G.:** Rio Pungo *Heudelot* 903 ! **S.L.:** *Smeathmann* ! Gbabai (fr. Sept.) *Glanville* 433 ! Waterloo (fr. May) *Deighton* 2665 ! Falaba (Mar.) *Aylmer* 16 ! Gbap (Mar., Apr.) *Adames* 18 ! 26 ! Mano Bonjema (fr. Apr.) *Deighton* 3713 ! **Lib.:** Monrovia *Whyte* ! Grand Bassa (Apr.) *Dinklage* 1647 ! R. Cess (fl. & fr. Mar.) *Baldwin* 11253 ! 11279 ! **S.Nig.:** Lagos (Feb., Mar.) *Moloney* ! *Dalz.* 1036 ! 1260 ! Epe (Feb.) *Millen* 159 ! Oni *Sankey* 13 ! Oware *Beauvois* ! Brass (fr. Apr.) *King-Church* 15 ! Calabar (fr. Apr.) *Holland* 23 ! Extends to Congo. (See Appendix, p. 67.)

4. **O. kibbiensis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 191 (1927) ; Kew Bull. 1928 : 216. A shrub or small tree with large, brilliant red calyx in fruit.
G.C.: Kibbi Hills (fr. Dec.) *Johnson* 266 ! Adjapoma, Kibbi (fr. Mar.) *Glover* ! Kumasi *Brown* 2261 ! Kwahu Plateau (Apr.) *Kitson* 1041 ! **S.Nig.:** Osun F.R. (fr. May) *Ejiofor* FHI 26125 ! Owenna F.R. (fr. Apr.) *A. F. A. Lamb* 223/37 ! Owo F.R. (fr. May) *Jones* FHI 3564 ! Obubra Dist. *Rosevear* 32/29 ! (See Appendix, p. 67.)

5. **O. ovata** *F. Hoffm.* Beitr. Fl. Centr. Ost-Afr. 19 (1889). Low shrub, with copper-coloured young leaves and bright yellow flowers ; often on rocky hills.
G.C.: Shai Hills (fr. Mar.) *Irvine* 945 ! 2730 ! Also in Uganda, Kenya and Tanganyika.

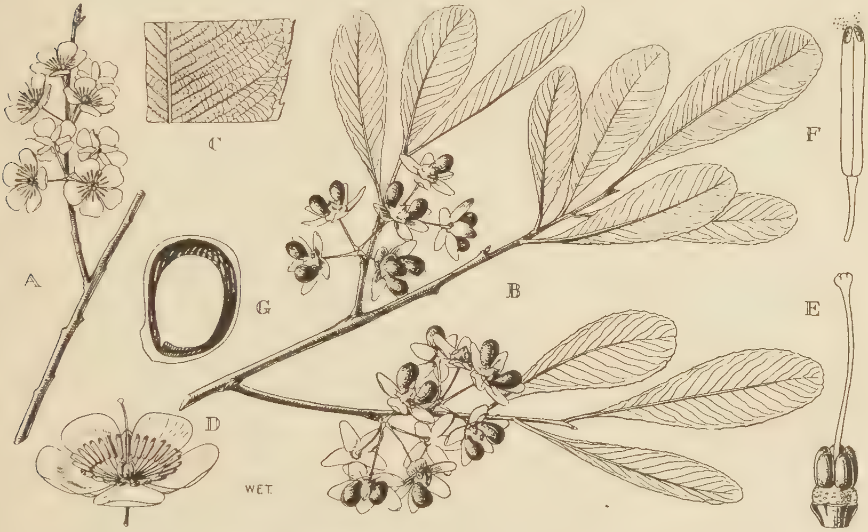

FIG. 87.—OCHNA RHIZOMATOSA (*Van Tiegh.*) *Keay* (OCHNACEAE).

A, flowering branch. B, fruiting branch. C, under-surface of leaf. D, flower. E, ovary with style. F, stamen. G, vertical section of a drupe.

6. **O. afzelii** *R. Br. ex Oliv.* F.T.A. 1 : 319 (1868) ; Gilg l.c. 239 ; Aubrév. Fl. For. Soud.-Guin. 77. *Ochna alba* of Chev. Bot. 106, partly (*Chev.* 12647 ; 12668) and of F.W.T.A., ed. 1, 1 : 191, partly, not *Ochnella alba* Van Tiegh. in Journ. de Bot. 16 : 123 (1902) and in Ann. Sci. Nat. 8, 16 : 346 (1902). *Ochnella barteri* Van Tiegh. in Journ. de Bot. 16 : 122 (1902). *Polyochnella barteri* (Van Tiegh.) Van Tiegh. in Ann. Sci. Nat. 8, 16 : 348 (1902). *Ochna barteri* (Van Tiegh.) Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 190, partly (excl. spec. & descr.). Shrub or small tree, sometimes up to 40 ft. high ; branchlets markedly lenticellate ; flowers white with yellow anthers, usually produced before the leaves are fully developed, sepals turning greenish and finally pink or red ; seeds black on the red torus. Mainly in relatively protected areas of savannah woodland and in forest margins.
Fr.G.: Fouta Djalon (Mar., Apr.) *Chev.* 12647 ! 12668 ! Timbo *Pobéguin* 1533 ! **S.L.:** *Afzelius* ! Sulimania (fr. Mar.) *Sc. Elliot* 5350 ! Waterloo (fr. May) *Deighton* 2646 ! **Iv.C.:** Bondoukou *Aubrév.* 774 ! Ferké *Aubrév.* 1813 ! **Togo:** Batilo *Kersting* 611*a* ! Atakpame *Mildbr.* 7462 ! **Dah.:** Ketou (Feb.) *Aubrév.* 23*d* ! **N.Nig.:** Patti Lokoja (fl. & fr. Apr.) *Elliott* 44 ! 57 ! Idah *Barter* 1641 ! Bassa (fr. June) *Elliott* 244 ! Anara F.R. (fr. May) *Keay* FHI 22962 ! Bauchi Plateau (fl. & fr. Aug.) *Lely* P. 217 ! **S.Nig.:** Onitsha (Apr.) *Duruh* FHI 15467 ! Udi (May) *Jones* FHI 799 ! *Kennedy* 3147 ! **Br.Cam.:** Fonfuka, Bamenda (fr. Apr.) *Maitland* 1484 ! Also in Ubangi-Shari, French Cameroons, A.-E. Sudan and Uganda. (See Appendix, p. 66.)

7. **O. schweinfurthiana** *F. Hoffm.* Beitr. Fl. Centr. Ost-Afr. 20 (1889) ; Gilg l.c. 240 ; Aubrév. Fl. For. Soud.-Guin. 77, partly. *Ochnella alba* Van Tiegh. in Journ. de Bot. 16 : 123 (1902). *Ochna alba* (Van Tiegh.) A. Chev. Bot. 106, partly (*Chev.* 555 only). Savannah tree, to 12 ft. high.
Fr.Sud.: Bambanatoumba (Mar.) *Chev.* 555 ! **G.C.:** Salaga (May) *Krause* ! Bujan to Sekaii (Apr.) *Kitson* 521 ! **Togo:** Agoniegebirge *Baumann* 473 ! **N.Nig.:** Sokoto (fl. Feb., fr. Mar.) *Lely* 845 ! Zaria *Keay* FHI 25724 ! Bauchi Plateau (fl. Feb., fr. May) *Lely* P. 173 ! *Kennedy* FHI 7233 ! **S.Nig.:** Lagos Colony *Rowland* ! Widespread in tropical Africa. (See Appendix, p. 67.)

8. **O. rhizomatosa** (*Van Tiegh.*) *Keay* in Kew Bull. 1953 : 82. *Ochnella rhizomatosa* Van Tiegh. in Journ. de Bot. 16 : 123 (1902) ; Ann. Sci. Nat. 8, 16 : 345 (1902). *Ochnella tenuis* Van Tiegh. l.c. *Ochna alba* of Chev. Bot. 106, partly (*Chev.* 610 ; 24023 ; 24024), not *Ochnella alba* Van Tiegh. *Ochna multiflora* of Chev. Bot. 106, not of DC. *Ochna hillii* Hutch. in Kew Bull. 1921 : 245 ; F.W.T.A., ed. 1, 1 : 191,

Ochna schweinfurthiana of Aubrév. l.c. 77, partly. A low shrub, to 4 ft. high; branchlets slender; usually leafless when in flower.
Fr.Sud.: Koba (Mar.) *Chev.* 610! Koumantou (Apr.) *Chev.* 721! **Fr.G.:** Sankaran (Mar.) *Pobéguin* 832! **G.C.:** Kulmasa, Bole (fr. Apr.) *McLeod* 842! **Dah.:** Mt. Atacora (June) *Chev.* 24023! 24024! **N.Nig.:** *Barter* 3431! Sokoto (Apr.) *Ryan* 25! 55! Zaria (fl. & fr. Feb.) *Dalz.* 380! *Milne-Redhead* 5035! Kontagora (Jan.) *Dalz.* 97! Jos (Mar.) *Hill* 2!

2. **OURATEA** Aubl.—Gilg in Engl. Bot. Jahrb. 33: 248 (1903). *Gomphia* Schreb.—F.T.A. 1: 319.

Leaves sessile or subsessile, often very large, elongate-oblanceolate or elongate-obovate, gradually narrowed to a cordate or subcordate base (see Fig. 88, A), or if cuneate, then densely crowded at the top of the stem:

Peduncle of inflorescence flattened, 15–30 cm. long below the first flower; inflorescences axillary; leaves up to about 60 cm. long and 16 cm. broad, crowded at the top of the stem:

Peduncle and inflorescence axis continuous, unbranched, without leafy bracts; pedicels solitary, rarely clustered, articulated at the base; leaves cordate or subcordate at base, very shortly petiolate .. .. 1. *elongata*

Peduncle with 2–3 leafy bracts immediately below the 1–3 racemes; pedicels clustered, articulated 1–3 mm. from the base; leafy bracts 6–20 cm. long, 2–8 cm. broad, cordate or subcordate at base; leaves cuneate at base, sessile (see Fig. 89) 2. *subcordata*

Peduncle not flattened, less than 15 cm. long; inflorescence compound, or at least the pedicels in clusters on the main axis of the raceme:

Inflorescence a dense raceme, usually unbranched, with clusters of flowers on the main axis:

Flowers in short subcorymbose racemes, 3–4 cm. long, each raceme subtended by two leafy bracts at the top of a 2–4 cm. long woody peduncle; racemes axillary in the uppermost leaves; leafy bracts cordate or subcordate at base; leaves up to about 40 cm. long and 12 cm. broad, cuneate at base, very shortly petiolate 3. *duparquetiana*

Flowers in an oblong terminal raceme:

Peduncle 7–15 cm. long, flowering axis 4–16 cm. long; pedicels densely clustered in groups of 5 or more, the clusters somewhat separated; buds obtuse; sepals in fruit 12–16 mm. long, 5–6 mm. broad, obtuse, fleshy, nervose; leaves up to about 55 cm. long and 15 cm. broad, cordate or subauriculate at base, subsessile 4. *mannii*

Peduncle 1–3 cm. long, flowering axis 5·5–6 cm. long; flowers dense, but pedicels in clusters of only 2 or 3; buds acute; sepals in fruit about 7 mm. long and 2 mm. broad, acute, chartaceous, not strongly nervose; leaves up to about 27 cm. long and 8 cm. broad (in only specimen seen), subcordate at base, subsessile .. .. 5. *oliveri*

Inflorescence a lax terminal panicle, with usually well-developed long lateral branches; leaves cordate and amplexicaul at base, sessile or nearly so:

Sepals obtuse, 10–12 mm. long and 5–6 mm. broad in fruit, coriaceous; pedicels about 1 mm. diam.; leaving stout "pegs"; leaves up to 30 cm. long and 9 cm. broad .. .. 6. *amplectens*

Sepals acute, about 5 mm. long and 2 mm. broad in fruit, chartaceous; pedicels about 0·5 mm. diam., leaving slender, usually short "pegs"; leaves up to 25 cm. long and 7 cm. broad .. .. 7. *schoenleiniana*

Leaves mostly distinctly petiolate and obtuse or cuneate, rarely rounded, at the base:

*Lateral nerves of the leaves not very numerous, rather distant and quite distinct from the tertiary nerves (see Fig. 88, B):

Flowers in pairs, axillary, or at leafless nodes, towards the end of the shoot but below the uppermost buds and leaves; leaves with long, stiff setae on the margin, acutely acuminate:

Leaves 6–13 cm. long, 2–5 cm. broad .. .. 8. *morsonii*

Leaves 12–22 cm. long, 3·5–7·5 cm. broad .. .. 9. *axillaris*

Flowers in terminal racemes or panicles, leaf-margins without stiff setae:

†Inflorescence a laxly branched panicle; stipules and scale-like bracteoles caducous or persistent:

Leaves conspicuously and rather closely spinulose-serrate, lamina elongate-elliptic to oblong-oblanceolate, 10–30 cm. long, 2·5–10 cm. broad; stipules caducous; pedicels usually 3–6 together; sepals 5–8 mm. long .. .. .. 10. *flava*

Leaves subentire or serrulate, not spinulose; stipules caducous or persistent:

Leaves very large, elongate-elliptic, 20–40 cm. long, 5–9 cm. broad, minutely denticulate in the upper half or two-thirds; stipules caducous; inflorescence widely paniculate, as long as or longer than the leaves .. 11. *calantha*

Leaves smaller, up to 20 cm. long, rarely more, stipules caducous or persistent:

Flowers very small, probably not more than 5 mm. long; inflorescence branched from the base; pedicels very short, articulated at the base 12. *micrantha*

Flowers larger ; pedicel 5–15 mm. long :

Inflorescence ample, with long branches, exceeding the leaves, or if shorter then pedicels only 1–3 together ; stipules caducous or persistent :

Stipules persistent ; inflorescence often with a cluster of scale-like bracteoles at the base :

Stipules subulate or long-triangular, 2·5–8 mm. long, leaves acutely acuminate :

Leaves abruptly acuminate, 8–23cm. long, 4–8 cm. broad ; inflorescence with long branches, pedicels 1–5 in isolated clusters :

Leaves obovate to obovate-elliptic, narrowed to a cuneate base ; bracteoles at base of inflorescence numerous and up to 15 mm. long 13. *nigroviolacea*

Leaves oblong to obovate-oblong, broad and rounded or obtuse at the base ; bracteoles at base of inflorescence few and up to 5 mm. long 14. *macrobotrys*

Leaves gradually acuminate, oblong-elliptic, 8–18 cm. long, 2–6 cm. broad :

Leaves subcoriaceous, tertiary nerves distinct ; inflorescence with long branches ; pedicels 1–6 in isolated clusters .. .. 15. *turnerae*

Leaves membranous, tertiary nerves obscure ; inflorescence with short lateral branches, lax ; pedicels solitary or paired, not clustered, borne at right angles to the axis .. .. 16. *leroyana*

Stipules shortly triangular, about 1–1·5 mm. long, aristate ; leaves acute, lateral nerves and midrib prominent above .. .. 17. *squamosa*

Stipules early caducous :

Leaves thinly papery, narrowly oblong-lanceolate, long-cuneate at base, acutely pointed at apex, 6–15 cm. long, 1·5–3·5 cm. broad, midrib rounded and raised above .. .. 18. *reticulata*

Leaves coriaceous, oblong-lanceolate, cuneate to rounded at base, acute at apex, 7–22 cm. long, 3–7 cm. broad, midrib flattened and scarcely raised above .. .. 19. *latepaniculata*

Inflorescence usually shorter than the leaves, pedicels usually 3 or more together; stipules and bracteoles broadly triangular, early caducous, leaving a conspicuous scar as wide as the stem or rhachis ; leaves narrowly elliptic to broadly oblanceolate :

Leaves coriaceous, midrib flattened and only slightly prominent beneath, margin entire or subserrulate, 8–18 cm. long, 2–5·5 cm. broad, shining on both surfaces .. .. 20. *vogelii*

Leaves papery, midrib rounded and prominent beneath, margin serrulate, sometimes markedly so, 8–24 cm. long, 2–8 cm. broad, surfaces more or less matt .. .. 21. *monticola*

†Inflorescence a simple raceme, rarely slightly branched at the base ; stipules and bracteoles persistent :

Flowers lax ; stipules and bracteoles triangular, 1–3 mm. long :

Leaves narrowly elliptic-lanceolate, acute at each end, 4–6 cm. long, 6–12 mm. broad .. .. 22. *dusenii*

Leaves broadly elliptic-lanceolate to elliptic, cuneate at base, acute to obtuse at apex, 7–17 cm. long, 2–5·5 cm. broad .. .. 23. *glaberrima*

Flowers dense ; stipules and bracteoles lanceolate, 3–8 mm. long :

Peduncle less than 4 cm. long, much shorter than the leaves :

Lateral nerves 8–11 on each side of the midrib, slightly prominent above, but usually sunken in grooves of the lamina and thus appearing impressed ; leaves obovate-elliptic, cuneate at base, acuminate at apex, 8–16 cm. long, 2–6 cm. broad .. .. 24. *sulcata*

Lateral nerves 12–20 on each side of the midrib, very prominent on the upper surface and not sunken in grooves of the lamina, impressed beneath ; leaves narrowly elliptic, acute at each end, 9–20 cm. long, 2·5–6·5 cm. broad 25. *congesta*

Peduncle 9–11 cm. long, about half as long as the leaves ; leaves oblanceolate, cuneate at base, acutely acuminate, 12–26 cm. long, 3–7 cm. broad, lateral nerves 15–22 on each side of the midrib, equally prominent on each surface 26. *ambacensis*

*Lateral nerves of the leaves very numerous and close, more or less parallel (see Fig. 88C):

‡Leaves coriaceous, elongate-obovate, 10–20 cm. long, 4–8 cm. broad :

Pedicels articulated at the base or almost at the base ; inflorescence much shorter than the leaves .. .. 27. *calophylla*

Pedicels articulated well above the base :

Inflorescence rather stout, nearly as long as the subtending leaf ; pedicels not more than 1 cm. in fruit .. .. 28. *calophylloides*

Inflorescence very slender, longer than the subtending leaf ; pedicels already over 1 cm. in flower .. .. 29. *stenorrhachis*

‡Leaves thin, lanceolate-elliptic, oblong-elliptic, or oblong, or slightly obovate ; not more than 12 cm. long and 5 cm. broad :

Pedicels articulated at the base or almost at the base :

Petiole 5 6 mm. long ; bracts at the base of the inflorescence caducous 30. *staudtii*

Petiole very short, about 1–2 mm. long ; bracts at the base of the inflorescence persistent :

Pedicels 14–22 mm. long in flower ; inflorescence 1–3-flowered, shortly pedunculate ; leaves linear-lanceolate, gradually acuminate, 10–12 cm. long, up to 2·5 cm. broad .. .. 31. *pauciflora*

Pedicels 15 mm. long or less in flower :

Leaves linear-lanceolate, acute, but hardly acuminate, up to 8 cm. long and 2·5 cm. broad .. .. 32. *acutissima*

Leaves oblanceolate-elliptic, rather abruptly acuminate, 7–10 cm. long, 3–3·5 cm. broad .. .. 33. *affinis*

Pedicels articulated well above the base ; inflorescence long-pedunculate, several-flowered ; leaves oblong to oblong-elliptic .. .. .. 34. *myrioneura*

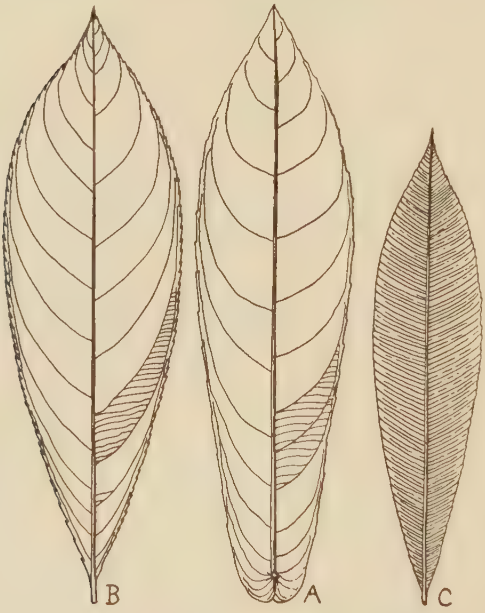

FIG. 88.—LEAVES OF OURATEA (OCHNACEAE).

A, *Ouratea schoenleiniana* (Klotzsch) Gilg.
B, *Ouratea flava* (Schum. & Thonn.) Hutch. & Dalz. ex. Stapf.
C, *Ouratea myrioneura* Gilg.

1. **O. elongata** (*Oliv.*) *Engl.* Bot. Jahrb. 17 : 80 (1893) ; Gilg in Engl. Bot. Jahrb. 33 : 258 (1903). *Gomphia elongata* Oliv. F.T.A. 1 : 321 (1868). Sparingly branched shrub or small tree, to 20 ft. high ; inflorescence pendulous, peduncle and sepals green, petals bright yellow ; fruiting calyx and carpels red.
S.Nig.: Omo F.R. (Feb.) *Jones* FHI 14735 ! Okomu F.R. (fl. Dec., fr. Feb.) *Brenan* 8425 ! 9177 ! Akure F.R. (fr. Oct.) *Adekunle* FHI 24225 ! Afi River F.R. (Dec.) *Keay* FHI 28194 ! Oban *Talbot* 423 ! 1371 ! **Br.Cam.:** Tiko (Jan.) *Dunlap* 92 ! S. Bakundu F.R. (fr. Mar.) *Brenan* 9271 ! Barombi (Jan., Apr.) *Preuss* 100 ; *Staudt* 555. **F.Po:** (Dec.) *Mann* 77 ! Also in Ubangi, French Cameroons, Gabon and Belgian Congo.

2. **O. subcordata** (*Stapf*) *Engl.* Pflanzenw. Afr. 3, 2 : 489 (1921) ; Hutch. & Dalz. in Kew Bull. 1928 ; 217 ; Aubrév. Fl. For. C. Iv. 2 : 278. *Gomphia subcordata* Stapf in Johnston Lib. 585, t. 247 (1906). *O. mannii* of Chev. Bot. 108, not of Engl. Unbranched, or sparingly branched, shrub 3–8 ft. high ; inflorescence pendulous, consisting of a long flattened peduncle bearing at the top 2–3 leafy bracts which subtend the racemes which apparently arise successively from the same peduncle ; petals bright yellow, sepals and inflorescence axis red in fruit, carpels dark purple.
S.L.: Laoma (Nov.) *Smythe* 11 ! Kenema (Oct.) *Deighton* 5205 ! Lalahun, Gaura (fr. Dec.) *King* 87*b* ! **Lib.:** Kakatown *Whyte* ! Dukwia R. (fl. Oct., Nov., fr. Feb.) *Cooper* 30 ! 166 ! Begwai (Sept.) *Bunting* 134 ! Gbanga (Sept.) *Linder* 614 ! Ganta (fr. Feb.) *Baldwin* 11024 ! Karmadhun, Kolahun (Nov.) *Baldwin* 10224 ! Tawata, Boporo (fr. Nov.) *Baldwin* 10293 ! **Iv.C.:** Mid. Sassandra to Mid. Cavally (June) *Chev.* 19209 ! Azaguie (Sept.) *Chev.* 22278 ! Yapo (Dec.) *Aubrév.* 602 ! (See Appendix, p. 67.)

3. **O. duparquetiana** (*Baill.*) *Gilg* in Engl. Bot. Jahrb. 33 : 258 (1903). *Gomphia duparquetiana* Baill. (1868). *O. corymbosa* Engl. Bot. Jahrb. 17 : 80 (1893) ; Chev. Bot. 107. *O. cameronii* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 193 (1927) ; Kew Bull. 1928 : 217. Shrub, 2–7 ft. high ; flowers yellow-red.
Lib.: Zwedru, Tchien (Aug.) *Baldwin* 7008 ! Diebla, Webo (July) *Baldwin* 6292 ! Jabroke, Webo (July) *Baldwin* 6493 ! **Iv.C.:** Guidéko (May) *Chev.* 16364 ! 16441 ! Attié (Feb.) *Chev.* 17411 ! Soubré (Mar.) *Chev.* 17795 ! Mid. Sassandra to Mid. Cavally (July) *Chev.* 19229 ! **G.C.:** Axim *Burton & Cameron* ! Bawdia (Dec.) *Vigne* 3154 ! Also in Gabon.

4. **O. mannii** (*Oliv.*) *Engl.* Bot. Jahrb. 17 : 80 (1893) ; Gilg in Engl. Bot. Jahrb. 33 : 258 (excl. var. *brachypoda*). *Gomphia mannii* Oliv. F.T.A. 1 : 321 (excl. var. *brachypoda*). Erect shrub, to 10 ft. high ; flowers yellow.
S.Nig.: Oban *Talbot* 1745 ! Aboabam, Ikom (Dec.) *Keay* FHI 28229 ! **Br.Cam.:** Kumba Div. (Feb., Mar.) *Jeme* FHI 1957 ! *Lobe* FHI 14090 ! *Ejiofor* FHI 14077 ! **F.Po:** (Dec.) *Mann* 24 !

5. **O. oliveri** (*Van Tiegh.*) *Keay* in Kew Bull. 1953 : 81, *Notocampylum oliveri* Van Tiegh. in Ann. Sci. Nat,

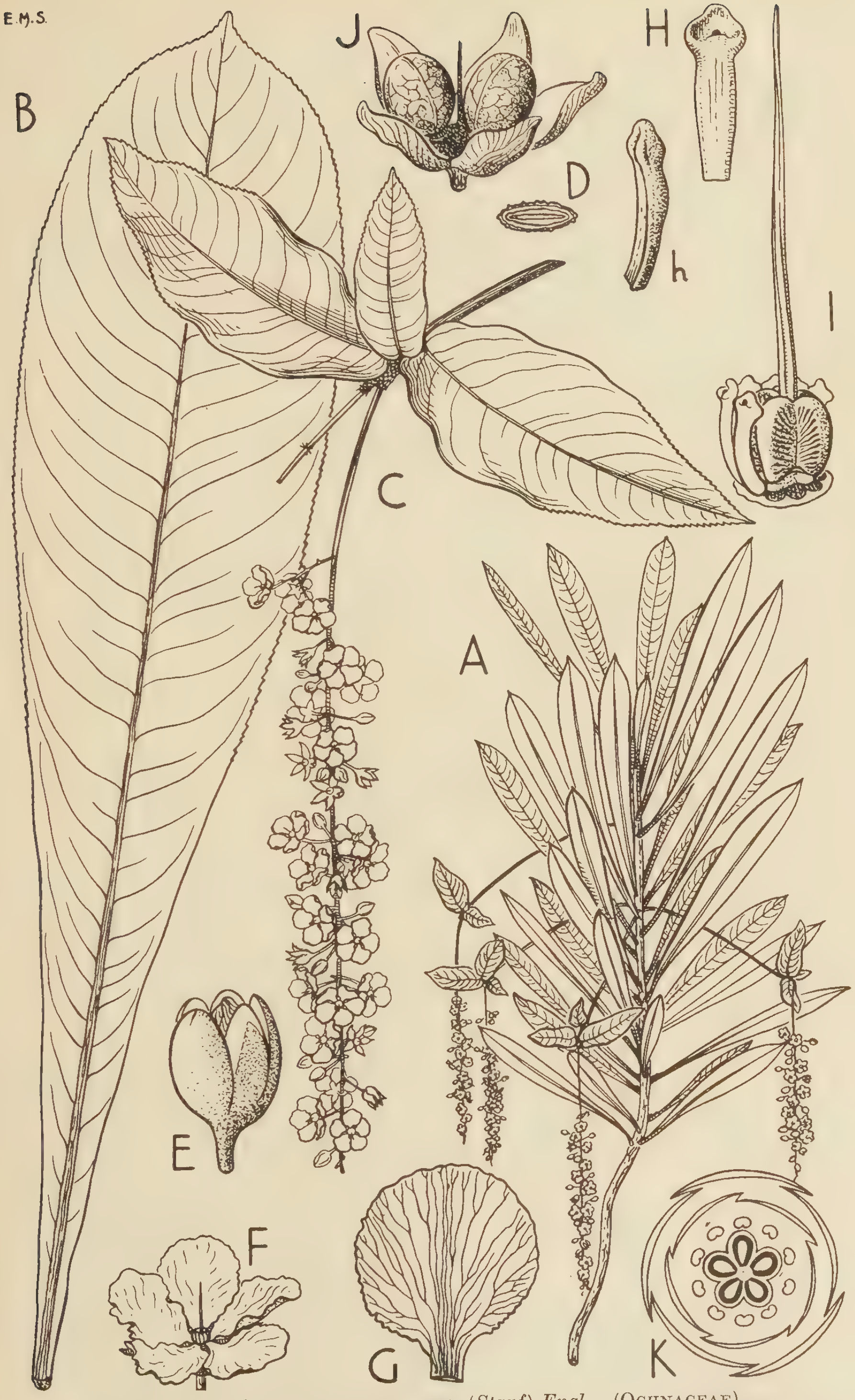

FIG. 89.—OURATEA SUBCORDATA (*Stapf*) *Engl.* (OCHNACEAE).

A, habit, × 1/5. B, leaf, × 1/3. C, racemes and leafy bracts, × 1/3. D, transverse section of peduncle, × 3. E, flower bud, × 3. F, flower, × 1½. G, petal, × 3. H & h, stamens, × 24. I, ovary and style, with some stamens removed, × 12. J, fruit, × 2. K, floral diagram.

A & E–I are drawn from *Deighton* 5205 ; B, C & D from *Barker* 1137 ; J from *Baldwin* 10293.

16 : 311 (1902). *Gomphia mannii* var. *brachypoda* Oliv. F.T.A. 1 : 321 (1868). *Ouratea mannii* var. *brachypoda* (Oliv.) Gilg l.c. 33 : 258 (1903). Shrub, 3–4 ft. high ; flowers yellow ; in marshy situations.

S.Nig.: Calabar *Thomson* 15 ! **Br.Cam.**: Tinto (fr. May) *Conrau* 109.

6. **O. amplectens** (*Stapf*) *Engl.* Pflanzenw. Afr. 3, 2 : 488 (1921) ; Hutch. & Dalz. in Kew Bull. 1928 : 217. *Gomphia amplectens* Stapf in Johnston Lib. 585 (1906). Tree to 20 ft. high, petals yellow, fruiting sepals deep red.

Lib.: Kakatown *Whyte* ! Dukwia R. (fl. Oct., fr. Feb.) *Cooper* 84 ! 155 ! Tawata, Boporo (Nov.) *Baldwin* 10304 ! Begwai (Sept.) *Bunting* 107 ! Cape Mount (fr. Dec.) *Dinklage* 2948 ! **G.C.**: Abiabo, Axim (fl. & fr. Nov.) *Vigne* 1429 ! Simpa (fr. Feb.) *Vigne* 3226 !

7. **O. schoenleiniana** (*Klotzsch*) *Gilg* in Engl. Bot. Jahrb. 33 : 264 (1903) ; Chev. Bot. 108 ; Aubrév. l.c. 2 : 278. *Gomphia schoenleiniana* Klotzsch in Schoenl. Nachl. 238, t. 4 (1857). A shrub, up to 12 ft. high.

Fr.G.: Farana (Jan.) *Chev.* 20614 ! **S.L.**: Bumbuna (Oct.) *Thomas* 3118 ! 3817 ! Mabonto (Oct.) *Thomas* 3494 ! **Lib.**: Cape Palmas *Schoenlein*. Kakatown *Whyte* ! Vonjama (Oct.) *Baldwin* 9918 ! Boporo Dist. (fr. Dec.) *Baldwin* 10285 ! 10702 ! Farmington R. (Dec.) *Bequaert* 5 ! St. Paul R. (Oct.) *Linder* 1009 ! Gbau, Sanokwele (Sept.) *Baldwin* 9418 ! Monrovia (Aug., Sept.) *Dinklage* 2869 ! *Baldwin* 8005 ! **Iv.C.**: Man (Mar.) *Aubrév.* 1057 ! Grabo (July) *Chev.* 19628 ! San Pedro (fl. Sept., fr. Nov.) *Thoiré* 63 ! 101 ! **G.C.**: Axim (Feb.) *Irvine* 2209 ! Subiri F.R. (Sept.) *Andoh* FH 5573 !

8. **O. morsonii** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 193 (1927) ; Kew Bull. 1928 : 217. *Gomphia axillaris* Oliv. F.T.A. 1 : 322, partly. Shrub, to 20 ft. high, in forest ; sepals red in fruit ; carpels black.

S.L.: *Morson* ! **Lib.**: Ganta *Harley* 1183 ! **Iv.C.**: Man (Mar.) *Aubrév.* 1088 ! Danané (fr. Mar.) *Aubrév.* 1114 ! Guidéko (fr. May) *Chev.* 16383 !

9. **O. axillaris** (*Oliv.*) *Engl.* Bot. Jahrb. 17 : 79 (1893). *Gomphia axillaris* Oliv. F.T.A. 1 : 322 (1868), partly. Shrub, to 12 ft. high ; in forest.

Br.Cam.: S. Bakundu F.R. (fr. Apr.) *Olorunfemi* FHI 30519 ! Also in Gabon.

10. **O. flava** (*Schum. & Thonn.*) *Hutch. & Dalz. ex Stapf* in Bot. Mag. t. 9023 (1924). *Gomphia flava* Schum. & Thonn. (1827). *G. reticulata* of F.T.A. 1 : 320, partly. *Monelasmum acutum*, *M. viride*, *M. thoirei*, *M. chevalieri*, *M. pungens* all of Van Tiegh. in Ann. Sci. Nat. 16 : 331–333 (1902). *Ouratea spinuloso-serrata* Gilg in Engl. Bot. Jahrb. 33 : 265 (1903) ; Chev. Bot. 109. *O. ashantiensis* De Wild. Pl. Bequaert. 4 : 441 (1928). *O. newiensis* De Wild. l.c. 501 (1929). *O. talbotii* De Wild. l.c. 514 (1929). Shrub or straggling tree, to 15 ft. high, petals yellow ; sepals orange or red in fruit, carpels black when ripe.

Fr.Sud.: Diaragonéa (Feb.) *Chev.* 471 ! **Fr.G.**: *Farmar* 227 ! Labaya *Paroisse* 79 ! Kouroussa *Pobéguin* ! Koulikoro (Feb.) *Chev.* 20650 ! **S.L.**: *Whitfield* ! Njala (Jan.) *Deighton* 494 ! Magbile (Dec.) *Thomas* 6085 ! **Lib.**: Gola Forest (fr. Apr.) *Bunting* ! Webo Dist. (fl. & fr. June, July) *Baldwin* 6036 ! 6335 ! Kakatown *Whyte* ! Du R. (July) *Linder* 100 ! Bolahun (Feb.) *Bequaert* 60 ! **Iv.C.**: Zegbe *Pobéguin* 36 ! San Pedro *Thoiré* 204 ! Abidjan *Aubrév.* 201 ! **G.C.**: *Hb. Vahl* ! *Farmar* 388 ! Cape Coast *Brass* ! Aburi Hills (fr. Nov.) *Johnson* 450 ! Obuasi (Apr.–June) *King-Church* 870 ! *Andoh* FH 4211 ! Akumadi (Apr.) *Kitson* ! **Togo**: Misahöhe (Nov.) *Mildbr.* 7389 ! Amedzofwe (Feb.) *Irvine* 166 ! **Dah.**: Adja Ouére (Dec.) *Le Testu* 253 ! Porto Novo (Feb.) *Chev.* 22912. **N.Nig.**: Abinsi (Apr.) *Dalz.* 781 ! **S.Nig.** : Lagos *Rowland* ! *Millen* 200 ! Ibadan (Dec., Jan.) *Schlechter* 13022 ! *Meikle* 907 ! 978 ! Idanre (Jan.) *Brenan & Keay* 8656 ! Sapoba *Kennedy* 2066 ! *Dundas* FHI 27241 ! Newi (Jan.) *Kitson* ! Oban *Talbot* ! Calabar (Mar.) *Holland* 91 ! *Thomson* 50 ! **Br.Cam.**: Buea (Jan.) *Maitland* 298 ! Bali to Bamoa (Feb.) *Migeod* 501 ! **F.Po**: *T. Vogel* 223 ! *Mann* 271 ! Also in French Cameroons and Ubangi. (See Appendix, p. 67.)

11. **O. calantha** *Gilg* l.c. 259 (1903). *O. vogelii* of F.T.A. 1 : 321, partly. *Monelasmum zenkeri* Van Tiegh., not *Ouratea zenkeri* Engl. Shrub, to 20 ft. high ; petals yellow ; sepals yellow at first, then brilliant red and fleshy in fruit ; in swamp forest by rivers.

S.Nig.: Okomu F.R. (Feb.) *Brenan* 9187 ! Sapoba (fl. June, fr. Nov.) *Kennedy* 2823 ! *Meikle & Keay* 550 ! Asaba *Leslie* 31 ! Brass *Barter* 1832 ! Also in French Cameroons.

12. **O. micrantha** (*Hook. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 193 (1927). *Gomphia micrantha* Hook. f. in J. Linn. Soc. 6 : 8 (1862). *G. reticulata* var. *micrantha* (Hook. f.) Oliv. F.T.A. 1 : 321. A shrub 15 ft. high.

F.Po: Clarence Peak, 5,000 ft. (Nov.) *Mann* 508 !

13. **O. nigroviolacea** *Gilg ex De Wild.* Pl. Bequaert. 4 : 503 (1929). Slender shrub or small tree, to 16 ft. high ; inflorescences pendulous, petals bright yellow.

S.Nig.: Okomu F.R. (Feb.) *Brenan* 9025 ! Oban *Talbot* 1282 ! Afi River F.R. (Dec.) *Keay* FHI 28181 ! Eket *Talbot* ! **Br.Cam.**: S. Bakundu F.R. (Mar., Apr.) *Brenan* 9303 ! *Ejiofor* FHI 29339 ! Also in French Cameroons and Angola.

14. **O. macrobotrys** *Gilg* l.c. 268 (1903). *Monelasmum sulcatum* Van Tiegh. l.c. 334 (1902).

Br.Cam.: Abonando, Mamfe (Mar.) *Rudatis* 8 ! Baball *Rudatis* 32. Ndeche, Widekum (Apr.) *Lobe Babute* 33/38 ! Also in French Cameroons and Gabon.

15. **O. turnerae** (*Hook. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 193 (1927) ; Kew Bull. 1928 : 217. *Gomphia turnerae* Hook. f.—F.T.A. 1 : 321, as var. of *G. reticulata*. *O. excavata* of Chev. Bot. 108, partly, not *Exomicrum excavatum* Van Tiegh. Tree or shrub to 20 ft.

Fr.G.: Benty (June) *Jac.-Fel.* 1710 ! Los Isl. (Feb.) *Chev.* 12092 ! **S.L.**: *Turner* ! *T. Vogel* 104 ! 134 ! Leicester Peak (Dec.) *Sc. Elliot* 3834 ! Freetown (Feb.) *Jones* FHI 12225 ! Mamaha (Nov.) *Thomas* 4573 ! Njala (July–Sept.) *Deighton* 5558 ! 5568 ! 5592 ! **Lib.**: Duport (Nov.) *Linder* 1486 ! 1500 ! Monrovia (Feb., June) *Dinklage* 2969 ! *Baldwin* 5901 ! Truo (Mar.) *Baldwin* 11389 ! **Iv.C.**: Obiosso (Mar.) *Chev.* 17763 ! **G.C.**: Atabuka (Nov.) *McAinsh* 16 !

16. **O. leroyana** (*Van Tiegh.*) *Keay* in Kew Bull. 1953 : 81. *Monelasmum leroyanum* Van Tiegh. in Ann. Sci. Nat. 16 : 330 (1902). Slender shrub or small tree to 6 ft. high.

S.Nig.: Okomu F.R. (Jan.–Mar.) *Richards* 3265 ! *Brenan* 8921 ! 8994 ! 9094 ! Usonigbe F.R. (fr. Oct.) *Ujor* FHI 15286 ! Oban *Talbot* 421 ! Calabar *Thomson* 95 ! Also in French Cameroons, Gabon and French Congo.

17. **O. squamosa** (*DC.*) *Engl.* in Mart. Fl. Bras. 12, 2 : 318 (1876) ; Chev. Bot. 109. *Gomphia squamosa* DC. in Ann. Mus. Paris 17 : 418 (1818). *Monelasmum heudelotii*, *M. djallonense*, *M. discolor*, *M. persistens*, *M. paroissei*, *M. flexuosum*, *M. maclaudii*, *M. konakrense*, *M. spiciforme*, *Exomicrum djallonense* all of Van Tiegh. in Ann. Sci. Nat. 16 : 329–340 (1902). *O. spiciformis* (Van Tiegh.) A. Chev. Bot. 109. *O. vogelii* of F.W.T.A., ed. 1, 1 : 191, partly. *O. reticulata* of F.W.T.A., ed. 1, 1 : 191, partly, not of (P. Beauv.) Engl. Straggling shrub or small tree ; flowers bright yellow ; leaves variable in shape.

Fr.Sud.: Monqueniéba (Mar.) *Chev.* 551 ! Dinguiray *Vuillet* ! **Port.G.**: Bissau (fl. & fr. Mar.) *Esp. Santo* 1900 ! **Fr.G.**: *Paroisse* 149 ! Conakry (Mar.) *Debeaux* 309 ! *Maclaud* ! Bogoutigny *Paroisse* 43 ! Fouta Djalon *Heudelot* 745 ! 945 ! *Paroisse* 211 ! Kouroussa (Mar.) *Pobéguin* 827 ! Mamou (Jan.) *Chev.* 20366 ! Kouria *Chev.* 18196 ! **S.L.**: *Smeathmann* ! *Morson* ! *T. Vogel* 86 ! *Barter* ! Sherbro *Sc. Elliot* 5811 ! Regent (Dec.) *Sc. Elliot* 4010 ! Freetown (Mar.) *Deighton* 2970 ! Bintumane Peak, 4,200 ft. (Jan.) *T. S. Jones* 118 ! **Lib.**: Monrovia (Feb.) *Whyte* ! *Baldwin* 11086 ! Ganta (May) *Harley* ! Mt. Wolagwisi, Pandamai (Mar.) *Bequaert* 107 ! Dukwia R. (Feb., Aug.) *Cooper* 182 ! *Linder* 285 ! **Iv.C.**: Petit Lahon (Jan.) *Pobéguin* 28 ! Mt. Tonkui (Mar.) *Aubrév.* 107 !

18. **O. reticulata** (*P. Beauv.*) *Engl.* Bot. Jahrb. 17 : 79 (1893) ; Gilg l.c. 266, partly. *Gomphia reticulata* P. Beauv. Fl. Oware 2 : 22, t. 72 ; F.T.A. 1 : 320, partly. *Monelasmum elegans* Van Tiegh. in Ann. Sci. Nat. 16 : 329 (1902). *Ouratea elegans* (Van Tiegh.) A. Chev. Bot. 108, partly (excl. spec.). *Ochna elegans* (Van Tiegh.) Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 190, partly (excl. spec. & descr.). Shrub ; flowers yellow.

Fr.G.: Macenta (Mar.) *Adam* 4166 ! **Lib.:** Bobei Mt., Sanokwele (Sept.) *Baldwin* 9584 ! **Iv.C.:** Banco *Martineau* 236 ! Abidjan *Aubrév.* 22 ! **G.C.:** Bonsadu (May) *Vigne* 1980 ! Pompo Headwater F.R. (fr. May) *Jackson* 2251 ! Subiri F.R., Benso (Sept.) *Andoh* FH 5574 ! **S.Nig.:** Oware *Beauvois* ! Oban *Talbot* ! **Br.Cam.:** Victoria (Mar.) *Kalbreyer* 97 ! Also in Gabon. (See Appendix, p. 67.)

19. **O. latepaniculata** *De Wild.* Rev. Zoolog. Afric. 7, Suppl. Bot. 56 (1920) ; Pl. Bequaert. 4 : 483 (1929).
Br.Cam.: Kumba (fr. Apr.) *Hutch. & Metcalfe* 151 ! Also in Belgian Congo.

20. **O. vogelii** (*Hook. f.*) *Engl. ex Gilg* in E. & P. Pflanzenfam. 3, 6 : 141 (1893) ; Gilg l.c. 271. *Gomphia vogelii* Hook. f.—F.T.A. 1 : 321, partly. *Monelasmum pobeguinii* Van Tiegh. in Ann. Sci. Nat. 8, 16 : 331 (1902). *O. pobeguinii* (Van Tiegh.) A. Chev. Bot. 108, partly (excl. spec.). *M. jollyanum* Van Tiegh. in Ann. Sci. Nat. 9, 5 : 168 (1907). Shrub, to 8 ft. high.
Fr.G.: Fouta Djalon *Heudelot* 745 (partly) ! **S.L.:** S. Prov. (Mar.) *Dawe* 443 ! Yoni, Bonthe Isl. (Mar.) *Deighton* 2473 ! **Lib.:** Grand Bassa (July) *T. Vogel* 53 ! Sinoe Basin *Whyte* ! **Iv.C.:** *Jolly* ! *Aubrév.* 1350 ! Grand Lahon (Nov.) *Pobéguin* 14 ! Mt. Nimba (Mar.) *Aubrév.* 1140 ! **G.C.:** *Burton & Cameron* ! Adamoa (Apr.) *Beveridge* 4197 !

21. **O. monticola** *Gilg* in Engl. Bot. Jahrb. 33 : 272 (1903). *Monelasmum nanense* Van Tiegh. in Ann. Sci. Nat. 9, 5 : 168 (1907). Small tree, to 30 ft. high ; panicles rigid, not drooping ; sepals, petals and ovary yellow.
S.Nig.: Mt. Koloishe, Obudu, 4,000–4,800 ft. (Dec.) *Keay & Savory* FHI 25058 ! 25279 ! **Br.Cam.:** Buea (Dec.–Feb.) *Preuss* 760 ; 829 ; *Deistel* 283 ! S. Bakundu F.R. (Mar., Apr.) *Brenan* 9440 ! *Olorunfemi* FHI 30501 ! Also in Ubangi-Shari.

22. **O. dusenii** *Gilg* l.c. 260 (1903). Erect leafy shrub, on rocks in rivers.
Br.Cam.: R. Ndian, Kumba (Mar.) *Smith* 79/36 !

23. **O. glaberrima** (*P. Beauv.*) *Engl. ex Gilg* in E. & P. Pflanzenfam. 3, 6 : 142 (1893); Gilg l.c. 263. *Gomphia glaberrima* P. Beauv. Fl. Oware 2 : 22 t. 71 ; F.T.A. 1 : 322. *Notocampylum decrescens*, *N. chevalieri*, *N. nigricans*, all of Van Tiegh. in Ann. Sci. Nat. 8, 16 : 312 (1902). *O. decrescens* (Van Tiegh.) A. Chev. Bot. 107. *Monelasmum glaucum* Van Tiegh. l.c. 332. *O. insculpta* Gilg l.c. 263. *O. kitsoni* De Wild. l.c. 479. *O. reticulata* of F.W.T.A., ed. 1, 1 : 193, partly. Erect shrub or small tree ; in forest by streams.
Fr.Sud.: Fincolo (Apr.) *Chev.* 770 ! Soukouraba (May) *Chev.* 880 ! 881 ! **S.L.:** Makumni (June) *Thomas* 509 ! Bunduna (Jan.) *Deighton* 3600 ! **Lib.:** Loffa R., Jenne (Jan.) *Bequaert* 30 ! Mano R., Gola Forest (Dec.) *Baldwin* 10695 ! **Iv.C.:** *Farmar* ! Grand Lahon (Dec.) *Pobéguin* 227 ! **G.C.:** Kintampo (Mar.) *Dalz.* 43 ! Tano R. (Dec.) *Brent* 36 ! **Togo:** Sokode (Mar.) *Schröder* 23. **Dah.:** *Poisson* ! **N.Nig.:** Allowa, Zaria Prov. (Feb.) *Dalz.* 428 ! R. Niger, Jemata (Dec.) *Elliott* 221 ! Gudi (Mar.) *Thornewill* 45 ! Idda *Barter* 1642 ! **S.Nig.:** Lagos *Barter* 2205 ! *Rowland* ! *Foster* 22 ! 50 ! 87 ! *Dalz.* 1035 ! Eba Isl. (Mar.) *Ross* 101 ! Olokemeji (Nov.) *Tamajong* FHI 14340 ! Oware *Beauvois* ! Okomu F.R. (Feb.) *Brenan* 9186 ! Nzam, Onitsha (Feb.) *Jones* FHI 527 ! Amaika, Engiba *Kitson* !
[The specimens cited above from Sierra Leone and Liberia may perhaps be found to represent a distinct species.]

24. **O. sulcata** (*Van Tiegh.*) *Keay* in Kew Bull. 1953 : 81. *Exomicrum sulcatum* Van Tiegh. in Ann. Sci. Nat. 8, 16 : 340 (1902). *Ouratea oliveriana* Gilg l.c. 261 (1903). *O. pobeguinii* of Chev. Bot. 108, partly ; Exell & Mendonça in Consp. Fl. Angol. 1 : 295 (1951), partly, not *Monelasmum pobeguinii* Van Tiegh. Erect shrub or small tree to 10 ft. high.
Iv.C.: Guidéko (June) *Chev.* 19059 ! **G.C.:** Pra Assum F.R. (Mar.) *Andoh* FH 4338 ! Ofin Headwaters (Apr.) *Vigne* 1911 ! **S.Nig.:** Shasha F.R. (Feb.–Apr.) *Ross* 57 ! 238 ! *Richards* 3210 ! 3330 ! Okomu F.R. (Dec.) *Brenan* 8612 ! Sapoba *Kennedy* 172*a* ! Asaba (Mar.) *Irvine* 3610 ! Cross R. *Johnston* ! Oban *Talbot* 1746 ! **Br.Cam.:** Rio del Rey *Johnston* ! Johann-Albrechtshöhe (Apr.) *Staudt* 606 ! S. Bakundu F.R. (Mar.) *Brenan* 9268 ! Also in French Cameroons and Cabinda.

25. **O. congesta** (*Oliv.*) *Engl. ex Gilg* in E. & P. Pflanzenfam. 3, 6 : 142 (1893) ; Gilg l.c. 261. *Gomphia congesta* Oliv. F.T.A. 1 : 322 (1868), partly. Forest shrub, to 6 ft. high ; inflorescence erect.
S.L.: *Hb. Brown* ! *Lane-Poole* 177 ! Kenema (Jan.) *Thomas* 7730 ! Gorahun (Nov.) *Deighton* 453 ! Bobobu, Giewahun (Dec.) *Deighton* 3812 ! **Lib.:** Kakatown *Whyte* ! Dukwia R. (Feb.) *Cooper* 162 ! Gbanga (Sept.) *Linder* 624 ! Nikabuzu to Zigida (Mar.) *Bequaert* 122 ! **G.C.:** Tano R., Datano (Sept.) *Chipp* 384 !

26. **O. ambacensis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 193 (1927) ; Kew Bull. 1928 : 218. *Exomicrum oliveri* Van Tiegh. in Ann. Sci. Nat. 8, 16 : 338 (1902). *Gomphia congesta* Oliv. F.T.A. 1 : 322, partly.
Br.Cam.: Ambas Bay (Feb.) *Mann* 12 ! Tiko (Jan.) *Dunlap* 171 ! Victoria *Preuss* 1193. Likomba (Oct.) *Mildbr.* 10520 !

27. **O. calophylla** (*Hook. f.*) *Engl.* Bot. Jahrb. 17 : 79 (1893) ; Gilg l.c. 257. *Gomphia calophylla* Hook. f. in Fl. Nigrit. 274, partly ; F.T.A. 1 : 320, partly. *Rhabdophyllum preussii* Van Tiegh. l.c. 322 (1902). A glabrous shrub or small tree, up to 50 ft. high, with coriaceous leaves.
S.L.: *Don* ! **Lib.:** Dukwia R. (Feb.) *Cooper* 184 ! 243 ! Monrovia (fr. Feb.) *Baldwin* 11066 ! **G.C.:** Anibil *Andoh* FH 3248 ! Axim (fr. Feb.) *Irvine* 2212 ! **S.Nig.:** Ikom *Catterall* 17 ! Bendiga Ayuk, Ikom (fr. Dec.) *Keay* FHI 28168 ! Oban *Talbot* ! **Br.Cam.:** Barombi *Preuss* 462 ! 1255 ! Masaka to Mufako, Kumba (fr. June) *Olorunfemi* FHI 30635 ! Also in French Cameroons. (See Appendix, p. 67.)

28. **O. calophylloides** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 193 (1927) ; Kew Bull. 1928 : 218. *Gomphia calophylla* Hook. f. in Fl. Nigrit. 274, partly (Fernando Po spec.). Like the preceding.
F.Po: (Nov.) *T. Vogel* 104 !

29. **O. stenorrhachis** *Gilg* l.c. 254 (1903). A glabrous shrub or tree with brown branches.
Br.Cam.: Bangwe (June) *Conrau* 194.

30. **O. staudtii** (*Van Tiegh.*) *Keay* in Kew Bull. 1953 : 82. *Rhabdophyllum staudtii* Van Tiegh. l.c. 322 (1902). *Rhabdophyllum barteri* Van Tiegh. l.c. 322 (1902). *O. barteri* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 193 (1927). *Gomphia affinis* of F.T.A. 1 : 320, partly. Riverside shrub, to 12 ft. high ; sepals and petals greenish-yellow, turning pink.
S.Nig.: Eba Isl. (Jan.) *Thornewill* 258 ! Sapoba (fl. & fr. Nov.) *Kennedy* 2264 ! *A. F. Ross* 229 ! *Keay* FHI 28072 ! Brass *Barter* 13 ! 1876 ! Also in French Cameroons.

31. **O. pauciflora** *Gilg* in Engl. Bot. Jahrb. 33 : 256 (1903). *Rhabdophyllum pauciflorum* Van Tiegh. l.c. 324 (1902). Shrub or small tree.
S.Nig.: Okomu F.R. (Feb.) *Brenan* 9050 ! Sapoba *Kennedy* 1590 ! **Br.Cam.:** Likomba (Oct.–Dec.) *Mildbr.* 10532 ! 10597 ! 10742 ! Johann-Albrechtshöhe (Jan.) *Staudt.* 567 !

32. **O. acutissima** *Gilg* l.c. 255 (1903). A shrub or tree.
S.L.: *Afzelius.* R. Scarcies *Sc. Elliot* 5916 ! Batkanu (Feb., Apr.) *Thomas* 24 ! 52 ! *Glanville* 171 !

33. **O. affinis** (*Hook. f.*) *Engl.* Bot. Jahrb. 17 : 79 (1893) ; Gilg l.c. 257 ; Chev. Bot. 107. *Gomphia affinis* Hook. f. in Fl. Nigrit. 274 ; F.T.A. 1 : 320, partly. A shrub, 12–15 ft.
Iv.C.: *fide* Chev. *l.c.* **G.C.:** Ancobra R. (Mar.) *Irvine* 2385 ! **S.Nig.:** *Jones* FHI 7406 ! R. Ogun, Abeokuta (Jan.) *Burtt* B. 12 ! **F.Po:** (Jan.) *Mann* 171 ! Clarence (Oct.) *T. Vogel* 29 ! (See Appendix, p. 67.)

34. **O. myrioneura** *Gilg* l.c. 256 (1903). A small tree with dark-green leaves.
S.L.: *T. Vogel* 134 ! **Lib.:** Dukwia R. *Cooper* ! **G.C.:** Kumasi *Cummins* 224 ! Axim (Feb.) *Irvine* 2167 ! Anaji (Feb.) *Williams* 33 ! **N.Nig.:** Idah *Barter* ! **S.Nig.:** Lagos *Dodd* 422 ! Ibadan (fr. Feb., Apr.) *Brenan & Keay* 8980 ! *Meikle* 1426 ! R. Osse, Iguoriakhi (fr. Jan.) *Brenan* 8926 ! Awka *Thomas* 909 ! Agulu *Thomas* 168 ! Umuahia *Oseni* FHI 8305 ! **Br.Cam.:** Fonfuka, Bamenda (fr. May) *Maitland* 1364 ! Also in French Cameroons.

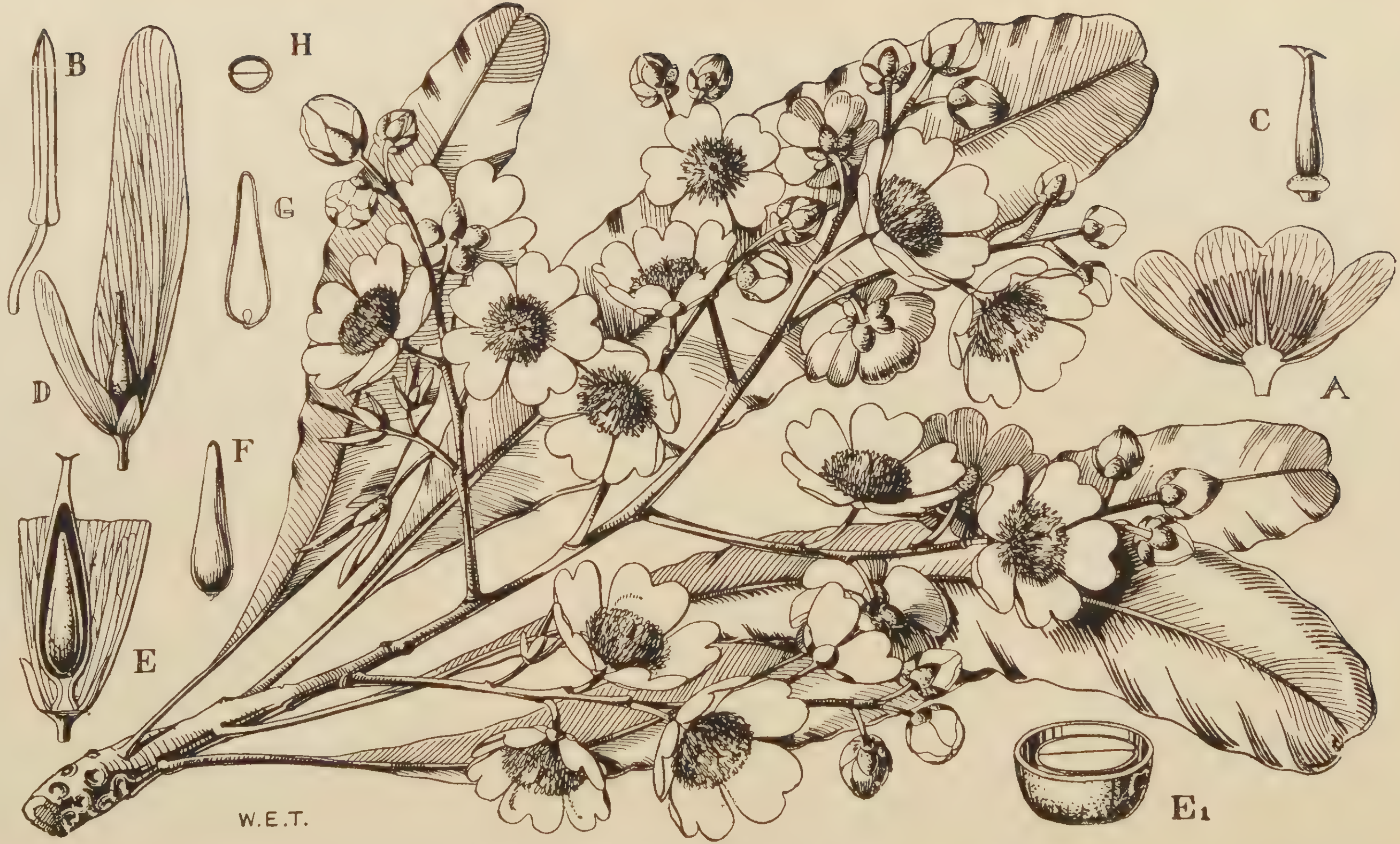

FIG. 90.—LOPHIRA LANCEOLATA *Van Tiegh. ex Keay* (OCHNACEAE).

A, flower cut vertically. B, stamen. C, ovary. D, fruit with enlarged sepals. E, the same in vertical section. E1, fruit cut transversely. F, seed. G, seed cut vertically. H, seed cut transversely.

Imperfectly known species.

1. **Ouratea** sp. **A** (Sect. *Reticulatae*).
   S.Nig.: Sapoba *Kennedy* 886 !
2. **Ouratea** sp. **B** (Sect. *Calophyllae*).
   S.Nig.: Oban *Talbot* !
3. **Ouratea** sp. **C** (Sect. *Calophyllae*).
   Br.Cam.: Victoria (Apr.) *Brenan* 9589 !
4. **Rhabdophyllum nutans** *Van Tiegh.* in Ann. Sci. Nat. 8, 16 : 322 (1903).
   Br.Cam.: Barombi *Preuss* 296.

3. LOPHIRA Banks ex Gaertn. f.—F.T.A. 1 : 173, under *Dipterocarpaceae*.

Savannah tree ; crown leaves narrowly oblong or oblanceolate, 4–7 times as long as broad ; petiole 1·5–6·5 cm. long ; leaves of coppice, saplings and regrowth shoots narrowly oblong or oblanceolate, always distinctly petiolate .. .. 1. *lanceolata*

Rain forest tree ; crown leaves oblong-obovate, 2-4 times as long as broad ; petiole 0·5–2·5 cm. long ; leaves of coppice, saplings and regrowth shoots broadly oblanceolate, sessile or subsessile .. .. 2. *alata*

1. **L. lanceolata** *Van Tiegh. ex Keay* in Kew Bull. 1953 : 488 (1954); Van Tiegh. in Journ. de Bot. 15 : 187 (1901), provisional name only. *L. spatulata* Van Tiegh. l.c. (1901), partly (*Barter* 1167), provisional name only. *L. africana* of G. Don Gen. Syst. 1 : 814 (1831), partly (descr. only). *L. alata* of F.T.A. 1 ; 173, partly; Chev. Bot. 56 ; F.W.T.A., ed. 1, 1 : 195, partly ; Chalk and Burtt Davy For. Trees and Timbers Brit. Emp. 2 : 76 ; Aubrév. Fl. For. C.Iv. 2 : 269 ; Fl. For. Soud.-Guin. 80, t. 13 ; not of Banks ex Gaertn. f. Savannah tree, to 40 ft. high ; usually with gnarled trunk ; petals white.
   Sen. : Casamance *Chev.* 2729 ! **Gam.** : Albreda (Mar.) *Perrottet* 99 ! Kombo Prov. *Dawe* 1 ! McCarthy Isl. (Jan.) *Dalz.* 8030 ! **Fr. Sud.:** Keniegué (fr. Jan.) *Chev.* 275 ! **Port G.** : Brene, Bissau (Jan.) *Esp. Santo* 1718 ! **Fr.G.** : *Pobéguin* 132 ! Rio Nunez *Heudelot* ! Kebali *Maclaud* 443 ! **S.L.:** *Afzelius* ! *Don* ! Surinnia (Apr.) *Sc. Elliot* 4644 ! Likuru (Feb.) *Sc. Elliot* 4973 ! Mabang (Feb.) *Lane-Poole* 21 ! Fintonia (Feb.) *Deighton* 5315 ! **Iv.C.** : Dyolas *Chev.* 21443. **G.C.:** Dukwesein (Dec.) *Chipp* 602 ! Ejura (fr. Aug.) *Chipp* 747 ! 763 ! **Togo** : *Baumann* 358 ! Kete-Krachi *Vigne* 1533. **Dah.:** *Poisson* ! *Le Testu* 273 ! **N.Nig.** : Nupe *Barter* 1167 ! Kontagora (Jan.) *Dalz.* 66 ! Anara F.R. (Oct.) *Keay* FHI 21112 ! Bauchi Plateau (fl. Jan., fr. June) *Lely* P. 6 ! *Kennedy* FHI 7253 ! **S. Nig.:** Olokemeji (Dec.) *A. F. Ross* 34 ! Awba Hills (Dec.) *Jones & Keay* FHI 4894 ! Also in French Cameroons, Ubangi-Shari, A.-E. Sudan and Uganda. (See Appendix, p. 64.)
2. **L. alata** *Banks ex Gaertn. f.* in Gaertn. Fruct. 3 : 52, t. 188 (1805); F.T.A. 1 : 173, partly ; F.W.T.A., ed. 1, 1 : 195, partly. *L. africana* Banks ex G. Don in Loud. Hort. Brit. 200 (1830), illegitimate name ; G. Don Gen. Syst. 1 : 814 (1831), excl. descr. ; *L. simplex* G. Don. l.c. (1831). *L. barteri*, *L. macrophylla*, *L. tholloni* and *L. spatulata* (partly, *Mann* 708) all of Van Tiegh. l.c. 186–7 (1901). *L. procera* A. Chev. Vég. Util. 5 : 154 (1909) ; Chev. Bot. 56 ; Aubrév. Fl. For. C. Iv. 2 : 272, t. 223. *L. alata* var. *procera* (A. Chev.) Burtt Davy in Chalk & Burtt Davy l.c. 2 : 78, t. 16 (1933). Large rain forest tree, to 180 ft. high and 20 ft. girth ; petals white.
   S.L.: *Smeathmann* ! Waterloo *Smythe* 103 ! **Lib.** : Gola Forest *Baldwin* 10746 ! R. Loffa, Boporo *Baldwin* 10673*a* ! Dukwia R. *Cooper* 79 ! **Iv.C.:** Yapo *Chev.* 22323 ! Bouroukrou *Chev.* 16120. **G.C.:** Ancobra R. (Dec.) *Johnson* 924 ! Popokyere, Tarquah *Chipp* 196 ! **S.Nig.:** Lagos Colony (Feb.) *Punch* ! Omo F.R. *Jones* FHI 17421 ! Brass *Barter* 35 ! 2085 ! Oban *Talbot* 1301 ! **Br.Cam.:** Ambas Bay (Jan.) *Mann* 708 ! Victoria (Dec.) *Maitland* 793 ! Likomba (Nov.) *Mildbr.* 10711 ! Also in French Cameroons, Spanish Guinea, Gabon and Belgian Congo.

4. FLEURYDORA A. Chev. in Bull. Mus. Hist. Nat. 5 : 158 (1933).

Stem and leaves glabrous : leaves clustered at the extremities of the branches, obovate, cuneate at base, retuse at apex, 5–12 cm. long, 3–7 cm. broad, entire, with very numerous, parallel, secondary nerves ; panicles 15-30 cm. long, terminal ; pedicels 10–12 mm. long ; sepals 5, ovate, 10–12 mm. long, caducous after flowering ; petals obovate, much larger than the sepals ; stamens 5, subsessile, anthers opening by pores ; ovary ovoid, 5-celled ; capsule ellipsoid, with numerous winged seeds *felicis*

F. felicis *A. Chev.* in Bull. Mus. Hist. Nat. 5 : 158, t. 1 (1933) ; Fl. Viv. 1 : 247–249, t. 39 ; Aubrév. Fl. For. Soud.-Guin. 58, t. 7. Erect shrub, or small tree, 12–22 ft. high ; on cliffs and rocky places ; petals yellow.
Fr.G.: Kindia, 1,600–2,000 ft. *Jac.-Fel.* 34 ! Boké (Apr.) *Chillou* ! Telimele (Oct.) *Pobéguin* 2202 !

5. SAUVAGESIA Linn.—F.T.A. 1 : 111, under *Violaceae*.

A low, decumbent or erect glabrous herb ; leaves oblanceolate, acute, narrowed to the base, about 2 cm. long, with conspicuous parallel nerves raised on the upper surface, serrulate on the margin ; stipules paired, persistent, pectinate, about 5 mm. long ; flowers solitary, axillary, white to pink, the pedicels becoming decurved in fruit and subarticulated towards the base ; capsule enclosed by the persistent green sepals .. .. *erecta*

S. erecta *Linn.*—F.T.A. 1 : 111 ; Chev. Fl. Viv. 1 : 242. A weed of rice swamps and other moist places.
Sen.: *Leprieur* ! M'boro *Perrottet* ! **Gam.:** *Dawe* 37 ! **Fr.Sud.:** Sikasso (May) *Chev.* 790. **Port G.:** Antula, Bissau (Nov.) *Esp. Santo* 1412 ! **Fr.G.:** Kindia (May) *Chev.* 13165 ! Kissi (Feb.) *Chev.* 20764 ! **S.L.:** *T. Vogel* ! Samu (Dec.) *Sc. Elliot* 4379 ! Njala (Sept.) *Deighton* 2105 ! Luti (Feb.) *Deighton* 4981 ! **Lib.:** Monrovia (Aug.) *Whyte* ! *Baldwin* 9190 ! Banga (Oct.) *Linder* 1192 ! Duport (Nov.) *Linder* 1466 ! **Iv.C.:** N. Baoulé (July) *Chev.* 22224. **G.C.:** Essiama (Feb.) *Irvine* 2316 ! Atwabo *Fishlock* 57 ! **Togo:** *Baumann* 265 ! **Dah.:** Atacora Mts. *Chev.* 24191. **N.Nig.:** Nupe *Barter* 1733 ! Abinsi (June) *Dalz.* 753 ! **S.Nig.:** Lagos (May) *Dalz.* 1271 ! Sapoba (Nov.–Jan.) *Kennedy* 1785 ! *Brenan* 8940 ! Udi (Nov.) *Keay* FHI 22720 ! Eket *Talbot* 3011 ! **Br.Cam.:** Abonando, Mamfe (Mar.) *Rudatis* 7 ! Widespread in tropical Africa, Madagascar and America. (See Appendix, p. 67.)

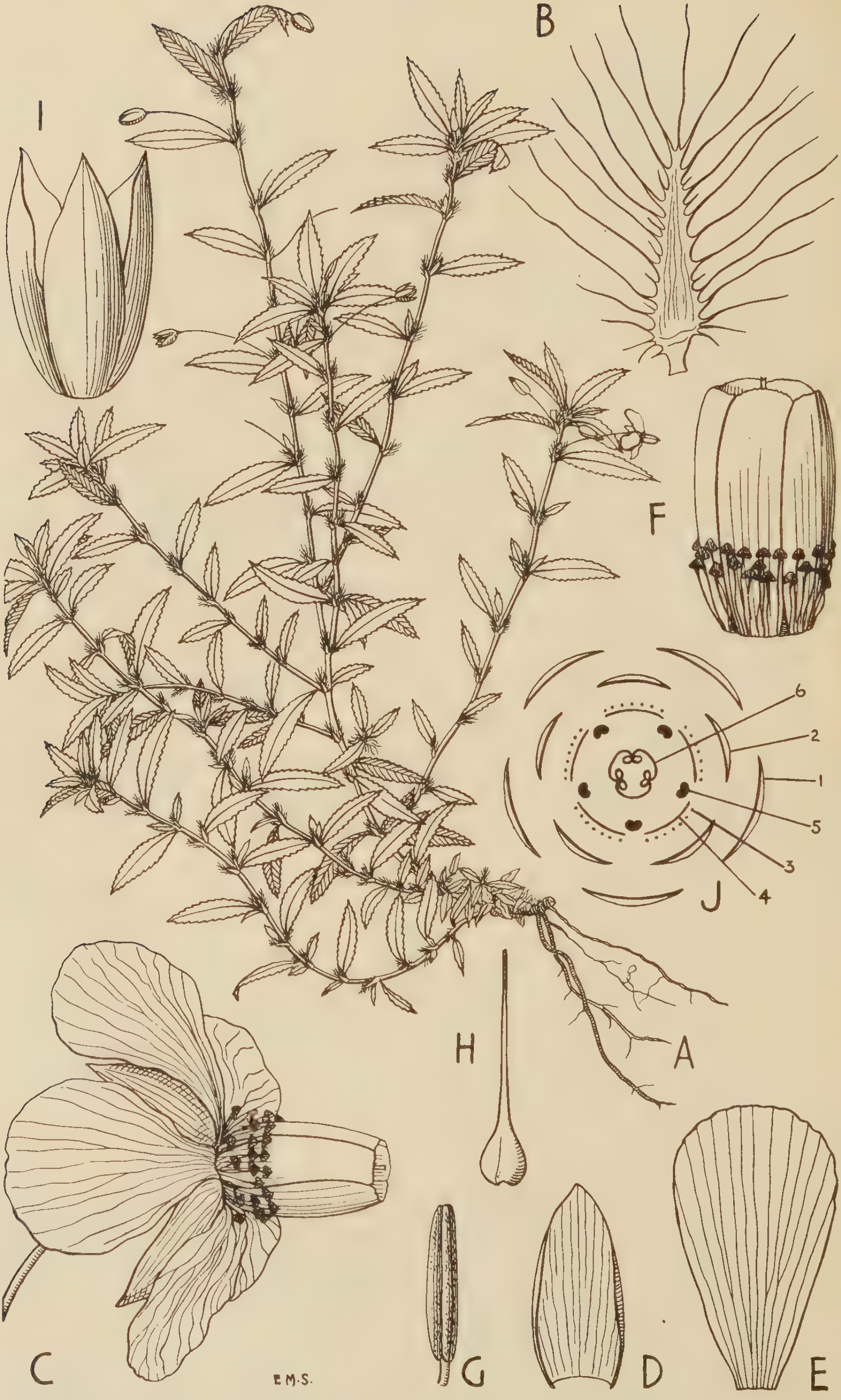

Fig. 91.—Sauvagesia erecta *Linn.* (Ochnaceae).

A, habit, × ⅔. B, stipule, × 6. C, flower, × 6. D, sepal, × 6. E, petal, × 6. F, outer and inner staminodes, × 9. G, stamen, × 9. H, ovary and style, × 9. I, capsule, × 6. J, floral diagram, with (1) sepals, (2) petals, (3) outer filiform staminodes, (4) inner petaloid staminodes, (5) stamens, (6) ovary.
Drawn from *Dalz.* 753.

64. ANCISTROCLADACEAE

Scandent shrubs with hook-like branchlets. Leaves alternate, simple, entire, leathery ; indumentum absent ; stipules inconspicuous or caducous. Flowers hermaphrodite, actinomorphic, small, soon falling off, in terminal panicles, the branches of which are recurved. Calyx-tube at first short, at length adnate to the base of the ovary, with imbricate lobes ; tube adnate to the fruit, with spreading wing-like unequal lobes. Petals 5, unequal, contorted, slightly connate at the base. Stamens perigynous, 5 or 10 ; anther-cells slightly unequal, with a shortly produced connective. Ovary 1-celled ; ovule solitary ; style thick and fleshy, with 3 stigmas. Fruit turbinate, surrounded by the wing-like calyx-lobes, with a leathery indehiscent pericarp. Seed subglobose ; testa intruding between the folds of the embryo ; cotyledons strikingly folded.

A small family with a discontinuous distribution, i.e. the tropical West African rain-forest, Kenya and Indo-Malaya. Distinguished by the hooked branches, accrescent calyx and remarkable seeds.

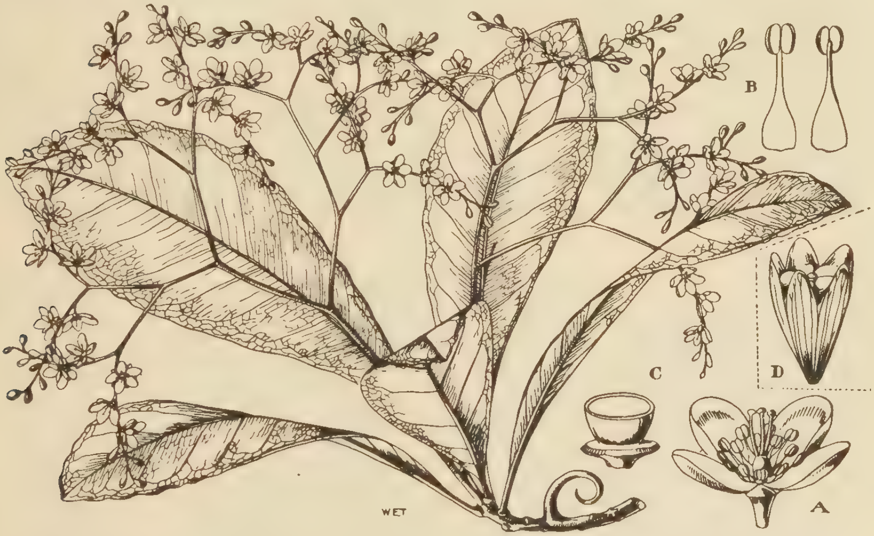

FIG. 92.—ANCISTROCLADUS GUINEENSIS *Oliv.* (ANCISTROCLADACEAE).
A, flower. B, stamens, front and back. C, cross-section of ovary. D, *Ancistrocladus abbreviatus* Airy Shaw, fruit enclosed in enlarged calyx.

ANCISTROCLADUS Wall.—F.T.A. 1 : 174.

Inflorescence very short and congested, 1–2 cm. long ; fruit obconic, 1·5 cm. long, with short, thick, erect wings ; leaves oblong-oblanceolate to spathulate-oblanceolate, 13–30 cm. long, 5–12 cm. broad ; leaf-margin at base revolute .. 1. *abbreviatus*
Inflorescence loosely cymose, with elongate branches :
  Leaves small, elliptic, 6–8 cm. long, 3–4 cm. broad, abruptly contracted at base into a " pseudo-petiole " ; leaf-margin at base revolute ; fruit unknown 2. *uncinatus*
  Leaves large, oblanceolate, 10–30 cm. long, gradually narrowed to base :
    Leaf-margin at base involute (i.e. inrolled on upper surface) ; venation less strongly reticulate ; lamina 4·5–8 cm. broad ; fruit subglobose, under 1 cm. long, with 3 long spathulate (up to 4·5 cm.) and 2 shorter obovate-oblong, thin, spreading wings .. .. 3. *guineensis*
    Leaf-margin at base revolute (i.e. inrolled on lower surface) ; venation more strongly reticulate ; fruit unknown :
      Leaves contracted at base into narrow " pseudo-petiole " ; venation very lax, lateral nerves about 7–8 pairs ; intramarginal nerve absent ; lamina 5·5–11·5 cm. broad ; inflorescence-branches relatively short and slender ; flowers small, crowded towards the tips .. .. 4. *barteri*

Leaves uniformly narrowed to base, without " pseudo-petiole " ; venation crowded, lateral nerves about 20 pairs ; intramarginal nerve distinct ; lamina 3–7 cm. broad ; inflorescence-branches very long and rather thick ; flowers relatively large, arranged rather distantly along most of the length of the branches
5. *pachyrrhachis*

1. **A. abbreviatus** *Airy Shaw* in Kew Bull. 1949 : 67 ; Kew Bull. 1950 : 148. *A. barteri* Sc. Elliot in J. Linn. Soc. 30 : 73 (1894), partly (*Sc. Elliot* 4797 ; *Barter* 1699). *A. barteri* Van Tiegh. in Journ. de Bot. 17 : 154 (1903). *Ancistrella barteri* Van Tiegh. l.c. 155 (1903). *Ancistrocladus barteri* of F.W.T.A., ed. 1, 1 : 196, partly (*Sc. Elliot* 4797). *A. guineensis* of F.W.T.A., ed. 1, 1 : 196, partly (*Barter* 1699). Large liane, in swamp forest near rivers ; flowers variously reported to be green, white, yellowish or pinkish.
   S.L.: Kora, Scarcies (fl. & fr. Feb.) *Sc. Elliot* 4797 ! Magbile (Dec.) *Thomas* 6268 ! Njala (fl. & fr. Dec., Jan.) *Deighton* 1852 ! 2589 ! **Lib.:** Peahtah, Upper St. Paul's R. (Oct., Dec.) *Linder* 1110 ! *Baldwin* 10603 ! Ganta *Baldwin* 13223 ! **G.C.:** R. Densu, Manhia (Nov.) *Akpabla* 219 ! **S.Nig.:** Onitsha (Feb.) *Barter* 1699 ! *Jones* FHI 621 !
2. **A. uncinatus** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 196 (1927) ; Kew Bull. 1928 : 218. A scandent shrub.
   S.Nig.: Eket *Talbot* 3108 !
3. **A. guineensis** *Oliv.* F.T.A. 1 : 175 (1868) ; Airy Shaw in Kew Bull. 1949 : 68, partly (excl. *Barter* 1699 ; excl. syn. *A. barteri* Van Tiegh. and *Ancistrella barteri* Van Tiegh. ; excl. spec. ex Sierra Leone) ; Kew Bull. 1950 : 149. Forest liane with reddish stems ; sepals in fruit madder-red, then brown when dry.
   S.Nig.: Etemi, Omo F.R. (fr. Mar.) *Jones & Onochie* FHI 16605 ! 16757 ! Fowa, Omo F.R. (fr. Mar.) *Jones & Onochie* FHI 16641 ! 17026 ! Sapoba *Keay* FHI 28061 ! Calabar (Feb.) *Mann* 2234 !
4. **A. barteri** *Sc. Elliot* in J. Linn. Soc. 30 : 73 (1894), partly (*Sc. Elliot* 4860) ; Airy Shaw in Kew Bull. 1950: 148 (excl. syn. *A. barteri* Van Tiegh. and *Ancistrella barteri* Van Tiegh.). *A. guineensis* of Airy Shaw in Kew Bull. 1949 : 68, partly (spec. ex Sierra Leone), not of Oliv. Forest liane, flowers greenish-white.
   S.L.: N.W. boundary of hills facing sea (Dec.) *Sc. Elliot* 3841 ! Mt. Gonkwi, Talla (Feb.) *Sc. Elliot* 4860 ! Benduhum, Tunkia (Dec.) *Deighton* 3813 ! Kwaoma *Deighton* 3885 ! **Lib.:** Ganta *Baldwin* 11016 ! Kitema, Sanokwele *Baldwin* 14068 ! Genna Tanyehun *Baldwin* 10756 !
5. **A. pachyrrhachis** *Airy Shaw* in Kew Bull. 1950 : 149. Scandent shrub, about 10 ft. high.
   Lib.: Monrovia, sandy area (Jan., May) *Baldwin* 5839 ! 10984 !

65. DIPTEROCARPACEAE

Trees with resinous wood. Leaves alternate, entire, penninerved ; indumentum often of two kinds, of stellate hairs or rarely of peltate scales ; stipules mostly small and deciduous, sometimes very large and enclosing the young bud, rarely persistent, leaving an annular scar after falling away. Flowers hermaphrodite, actinomorphic, fragrant, in axillary panicles. Calyx-tube short or well developed, free or adnate to the ovary ; lobes 5, imbricate or valvate, mostly greatly enlarged, wing-like, and ascending in fruit and then strongly nervose, rarely small and reflexed or spreading. Petals 5, much contorted, free or slightly connate at the base, often hairy and inconspicuous. Stamens

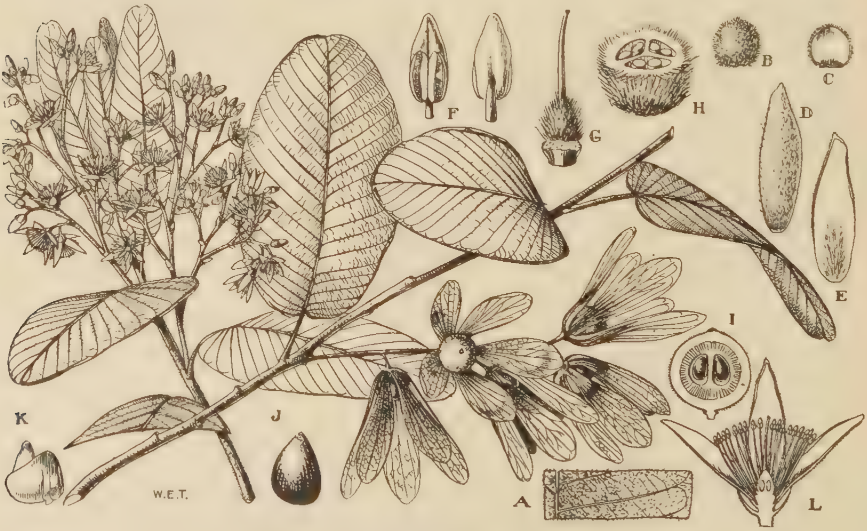

Fig. 93.—Monotes kerstingii *Gilg* (Dipterocarpaceae).

A, under-surface of leaf. B, sepal, outer surface. C, sepal, inner surface. D, E, petals, outer and inner surface. F, stamens, from front and behind. G, ovary with style. H, cross-section of ovary. I, vertical section of fruit. J, seed. K, embryo. L, flower in vertical section.

rarely definite, hypogynous or subperigynous ; filaments short, often dilated at the base ; anthers 2-celled, opening lengthwise ; connective mucronate or aristate or club-shaped. Ovary inserted on the broad torus or slightly immersed in it, 3-celled ; style subulate or variously thickened, entire or 3-lobed ; ovules 2 in each cell. Fruit free from or included in the enlarged calyx-tube, rarely closely adnate to it, indehiscent, usually 1-seeded. Seeds without endosperm ; cotyledons thick and equal or variously contorted.

A family mostly found in Indo-Malaya, very rare in Africa. Distinguished mainly by the enlarged wing-like calyx-lobes in fruit.

MONOTES A. DC. Prod. 16, 2 : 623 (1868).

Calyx-lobes 5. Petals 5, hairy. Stamens numerous ; anthers with produced connective. Calyx-lobes equally enlarged in fruit.

A shrub or small tree ; branchlets pubescent ; leaves elliptic or oblong-elliptic, slightly cordate at the base, rounded and emarginate at the apex, 7–12 cm. long, 4–7 cm. broad, glabrescent above and finely reticulate, softly tomentose beneath, with about 14–16 pairs of prominent lateral nerves ; petiole 1·5–2·5 cm. long ; flowers greenish, in short axillary cymes, the whole inflorescence densely and softly tomentose ; fruit ovoid-globose, about 1·5 cm. in diam., pilose, surrounded by the dry reticulate obovate-oblong accrescent calyx-lobes about 4 cm. long .. .. .. *kerstingii*

M. kerstingii *Gilg* in Engl. Bot. Jahrb. 41 : 288 (1908) ; Chev. Bot. 56 ; Aubrév. Fl. For. Soud.-Guin. 84, t. 13 ; Bancroft in Kew Bull. 1934 : 233 ; Bancroft in Bull. Soc. Brot. 13 : 326–368 (1938–39). *Caraipa ? africana* Oliv. F.T.A. 1 : 172 (1868). *M. caloneurus* Gilg, partly—Hutch. in Kew Bull. 1921 : 358. Savannah tree, to 50 ft. high, but usually only about 10–20 ft. high ; flowers yellow, wings of fruit pink. **Fr.Sud.:** Kita *Dubois* 207 ! **Fr.G.:** Kouroussa (Dec.) *Pobéguin* 597 ! **Iv.C.:** Ferkéssédougou, and Batié to Kampti, *fide* Aubrev. *l.c.* **G.C.:** Bosomoa F.R. (May) *Vigne* 3000 ! Kintampo (fl. & fr. Nov.) *Andoh* FH 5425 ! Prang (June) *Vigne* 3907 ! **Togo:** Sokode-Basari (fl. & fr. May, Oct.) *Kersting* 2 ! **Dah.:** *fide* Bancroft *l.c.* **N.Nig.:** *Baikie* ! Sokoto Prov. (June) *Dalz.* 532 ! Matyoro (Oct.) *Thornewill* 134 ! Naraguta (Aug.) *Lely* 517 ! P. 674 ! Also in French Cameroons, Ubangi-Shari and A.-E. Sudan. (See Appendix, p. 68.)

66. MYRTACEAE

Trees or shrubs. Leaves simple, mostly entire, opposite or rarely alternate, glandular-punctate ; stipules 0 or rarely very small. Flowers mostly actinomorphic, hermaphrodite or polygamous by abortion. Calyx-tube more or less adnate to the ovary ; lobes 3 or more, imbricate or valvate or irregularly split. Petals 4–5, rarely 6 or 0, inserted on the margin of the disk lining the calyx-tube, imbricate or connivent in a mass. Stamens numerous, rarely few, inserted on the margin of the disk, 1- or more-seriate, inflexed in bud or twice folded or straight ; filaments free or connate at the base into a short tube or in bundles opposite the petals ; anthers small, 2-celled, opening lengthwise by slits or rarely by apical pores, the connective often tipped by a gland. Ovary inferior, syncarpous, 1- to many-celled, with mostly axile, rarely parietal placentas ; ovules rarely solitary or few. Fruit inferior, loculicidally dehiscent or indehiscent. Seeds with no (or very little) endosperm ; embryo straight, incurved, circular or spiral.

Flowers solitary or fasciculate, axillary ; sepals distinct ; petals falling off separately 1. **Eugenia**

Flowers in terminal cymes ; calyx more or less truncate ; petals more or less calyptrate and falling off together.. .. .. 2. **Syzygium**

Besides the above indigenous genera, *Psidium guajava* Linn. (the Guava), *Melaleuca leucadendron* Linn. and various species of *Eucalyptus*, have been introduced and are widely cultivated.

1. **EUGENIA** Linn.—F.T.A. 2 : 436.

Stems short and simple from an underground rhizome, puberulous ; leaves elliptic-lanceolate, obtuse at apex, subacute at base, 7–10 cm. long, 3–4·5 cm. broad, closely gland-dotted, puberulous beneath ; flowers axillary, solitary, pedicels 2–3 cm. long 1. *subherbacea*

Stems much-branched ; shrubs or trees :
  Leaves narrowly lanceolate, 2–4 cm. long, 2–4 mm. broad ; internodes very short ; flowers few, almost sessile in the axils of the upper leaves .. .. 2. *dusenii*
  Leaves not narrowly lanceolate, at least 5 mm. broad, usually much more :
    *Leaves cordate at base, more or less ovate :

Pedicels about 15 mm. long ; branchlets glabrous ; leaves shortly acuminate, 4–5 cm. long .. .. 3. *uniflora*

Pedicels very short, up to 4 mm. long ; branchlets softly pubescent ; leaves not acuminate, 2·5–4 cm. long .. .. 4. *nigerina*

*Leaves rounded to acute at base :

Calyx-lobes 6–8 mm. long and broad, suborbicular ; flower buds just before opening 6–9 mm. in diam. ; pedicels 5–20 mm. long :

Leaves thickly coriaceous, elliptic-obovate, shortly acuminate, 5–8 cm. long, 2–4·5 cm. broad, with 4–5 pairs of lateral nerves slightly prominent on both surfaces ; pedicels stout, nearly 2 cm. long, solitary or paired in each axil, bracteoles broadly ovate, 2 mm. long ; calyx-lobes coriaceous, 7–8 mm. diam., like the pedicels sparingly pubescent .. .. 5. *calycina*

Leaves thin, elliptic, more or less distinctly acuminate or long-acuminate, 6–10 cm. long, 2·5–3·5 cm. broad, with 10–13 pairs of lateral nerves rather obscure on each surface ; pedicels 5–15 mm. long, often clustered towards the ends of the shoots ; calyx-lobes thin, 6–7 mm. diam., like the pedicels densely rusty-tomentose 6. *elliotii*

Calyx-lobes less than 4 mm. long and broad ; flower-buds just before opening less than 5 mm. in diam. :

Leaves rounded or very obtuse at apex, not acuminate :

Pedicels 5–35 mm. long, fasciculate :

Pedicels up to 2 cm. long :

Branchlets pubescent ; pedicels solitary or paired, slender, up to 1·5–2 cm. long ; leaves thin, elliptic, up to 6 cm. long and 3 cm. broad, closely dotted beneath 7. *kerstingii*

Branchlets glabrous ; pedicels up to 1 cm. long, several in each cluster ; leaves thickly coriaceous, elliptic or ovate-elliptic, up to 9 cm. long and 5 mm. broad, closely dotted beneath .. .. 8. *coronata*

Pedicels 3–4·5 cm. long ; branchlets, petioles and midrib beneath shortly white pilose when young ; leaves subsessile, oblong, 8–13 cm. long, 4–5 cm. broad ; lateral nerves 6–7 on each side of the midrib, prominent, forming a distinct intramarginal nerve .. .. 9. *togoensis*

Pedicels less than 4 mm. long ; flowers in very short racemes with the central bracteate axis up to 4 mm. long, mostly borne below the leafy parts of the shoots ; leaves elliptic, obtuse at each end, 6–10 cm. long, 3–5·5 cm. broad 10. *gilgii*

Leaves more or less distinctly acuminate :

Ovary glabrous ; pedicels glabrous or shortly and rather sparsely pubescent :

Pedicels 4 mm. or more long :

Leaves 2–8 cm. long, 1–4 cm. broad ; elliptic-lanceolate :

Pedicels 4–6 mm. long ; stems glabrous or very shortly puberulous 11. *salacioides*

Pedicels 8–15 mm. long ; stems densely rusty-pubescent .. 12. *leonensis*

Leaves 7–12 cm. long, 3–6 cm. broad, oblong-elliptic ; young shoots pubescent, woody branchlets with scaly bark ; pedicels 4–6 mm. long 13. *pobeguinii*

Pedicels less than 4 mm. long :

Leaves with a very strong marginal nerve about 5 mm. from each margin, almost as prominent as the midrib ; leaves elliptic or obovate-elliptic, long-cuneate at base, gradually acuminate, 12–16 cm. long, 6–8 cm. broad, petiole 8–12 mm. long .. .. 14. *talbotii*

Leaves with the lateral nerves looped near the margin, but with the loops much less prominent than the midrib ; leaves oblong-elliptic, very shortly cuneate at base, obtuse and gradually acuminate, 8–12 cm. long, 3–4·5 cm. broad :

Leaves rather long-petiolate ; branchlets glabrous .. .. 15. *whytei*

Leaves subsessile ; branchlets shortly pilose .. .. 16. *afzelii*

Ovary and pedicels densely pilose :

Leaves up to 10 cm. long and 4 cm. broad ; flowers subsessile ; calyx-lobes more or less densely pubescent :

Leaves narrowly oblong-elliptic, rather gradually acuminate, 5–10 cm. long, 2–4 cm. broad, lateral nerves about 8–10 pairs ; flowers several in each axil 17. *obanensis*

Leaves ovate, long-acuminate or subcaudate, 5–6 cm. long (including the approx. 1 cm. long acumen), 2·5–3 cm. broad ; lateral nerves about 5–6 pairs ; flowers apparently solitary .. .. 18. *buchholzii*

Leaves more than 10 cm. long and 4 cm. broad ; minutely pubescent beneath ; calyx-lobes glabrous :

Pedicels 4–10 mm. long :

Leaves broadly elliptic, very obtusely and shortly acuminate, with about 10 or more straight nerves which loop and form a nearly straight marginal nerve, 9–15 cm. long, up to 9 cm. broad .. .. 19. *fernandopoana*

Leaves elongate-elliptic, with nerves as above, subcoriaceous, 9–15 cm. long, 4–5·5 cm. broad, obtuse at base ; fruits depressed-globose, over 1 cm. broad 20. *memecyloides*

Leaves oblong-lanceolate, with about 6 ascending nerves widely looped and not forming a definite marginal nerve .. .. 21. *kalbreyeri*

Pedicels very short, not more than 2 mm. long ; leaves oblong-elliptic, rounded or shortly cuneate at the base, 10–20 cm. long, 4–7 cm. broad, firmly chartaceous, with about 10 pairs of lateral nerves ; branchlets rusty-tomentellous .. .. 22. *calophylloides*

1. **E. subherbacea** *A. Chev.* in Bull. Soc. Bot. Fr. 58, Mém. 8D : 170 (1912). *E. herbacea* A. Chev. in Bull. Soc. Bot. Fr. 55, Mém. 8B : 36 (1908), not of Berg (1859). A plant of the dry bush, throwing up annual stems after burning ; flowers fairly large, white, fragrant ; fruit succulent.
G.C.: Salaga (Apr.) *Dalz.* 12 ! Wabila (Feb.) *Kitson* ! **Togo:** Yendi (Apr.) *Akpabla* 513 ! Also in Ubangi-Shari-Chad.

2. **E. dusenii** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 289 (1899). Small shrub, on rocks by waterfall, flowers white.
Br.Cam.: *Dusen.* Ndian waterfall, Kumba (Mar.) *Smith* 84/36 !

3. **E. uniflora** *Linn.* Sp. Pl. 1 : 470 (1753). *E. michelii* Lam.—F.T.A. 2 : 437 ; Chev. Bot. 267. A shrub or small tree ; fruit ridged, with smooth red skin. Introduced from Brazil and cultivated in gardens as the " Pitanga Cherry." (See Appendix, p. 68.)

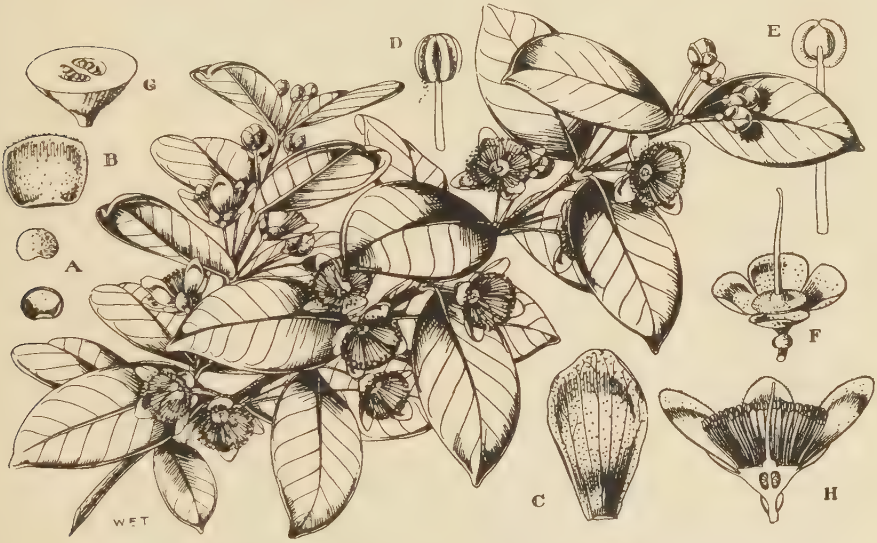

Fig. 94.—Eugenia calycina *Benth.* (Myrtaceae).

A, bracteoles, outer and inner surface. B, sepal. C, petal. D, E, anthers, front and back. F, flower with petals and stamens removed. G, cross-section of ovary. H, flower in vertical section.

4. **E. nigerina** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 199 (1927) ; Kew Bull. 1928 : 219 ; Aubrév. Fl. For. Soud.-Guin. 85 ; Chev. Bot. 268, name only. A shrub, up to 20 ft. or more, often in clumps ; flowers white, fragrant.
Fr.Sud.: Dialiba to Langana (Jan.) *Chev.* 260 ! San (June) *Chev.* 1075. Koulikoro (Oct.) *Chev.* 3010. **Iv.C.:** dunes of R. Comoé, Bettié (Mar.) *Chev.* 17556. Tienfalla *Aubrév.* 3073.

5. **E. calycina** *Benth.*—F.T.A. 2 : 437. A shrub with coriaceous leaves and fairly large, white flowers 1 in. or more across ; fruits globose, about ¾ in. diam., crowned by the large persistent calyx ; in coastal vegetation.
S.L.: Yoni, Bonthe Isl. *Deighton* 2463 ! **Lib.:** Monrovia (fl. Jan.–Mar., fr. Aug.) *Whyte* ! *Baldwin* 12533 ! Sinoe Basin *Whyte* ! Grand Bassa (July) *T. Vogel* 85 ! Sinkor (July) *Barker* 1383 !

6. **E. elliotii** *Engl. & v. Brehm.* in Engl. Bot. Jahrb. 54 : 331 (1917) ; Aubrév. Fl. For. Soud.-Guin. 87. *E. djalonensis* A. Chev. Bot. 267, name only. A shrub or small tree ; young branches rusty-tomentose ; flowers fairly large, white.
Fr.G.: Ditinn to Diaguissa (Apr.) *Chev.* 12853 ! Dalaba (Mar.) *Dalz.* 8388 ! Rio Pongo *Heudelot* 901 ! **S.L.:** Mt. Gonkwi, Talla Hills (Feb.) *Sc. Elliot* 4832 ! Rokupr, Magbema (Mar.) *Jordan* 419 ! Nyungeru *Thomas* 7269 !

7. **E. kerstingii** *Engl. & v. Brehm.* l.c. 333 (1917). *E. coronata* of F.T.A. 2 : 437 ; of F.W.T.A., ed. 1, 1 : 199, partly (*Barter* 876) ; of Aubrév. l.c. 85, 87, partly (Nigerian spec.) ; not of Schum. & Thonn. A shrub, 10–12 ft., with shining leaves and white flowers.
Togo: Sokodé-Basari plateau on rocky open ground (May) *Kersting* 742. **N.Nig.:** Wuru, Borgu *Barter* 876 ! Nupe *Barter* 1318 ! Abinsi (Mar.) *Dalz.* 765 ! Yola (Dec.) *Dalz.* 83 ! **S.Nig.:** Umueze, Onitsha (Feb.) *Jones* FHI 5021 !

8. **E. coronata** *Schum. & Thonn.* Beskr. Guin. Pl. 230 (1827) ; Aubrév. l.c. 85, 87, partly (*Dalz.* 8276). *E. myrtoides* G. Don (1832). *E. littorea* Engl. & v. Brehm. l.c. 335. A shrub or small tree, up to 20 ft. high, in savannah and fringing forest of the coastal plains ; flowers white ; fruits ovoid, about ½ in. long, green, turning black when ripe.
G.C.: Axim. (Feb.) *Irvine* 2304 ! Cape Coast to Elmina (Mar.) *Dalz.* 8276 ! Accra (Aug.) *Don* ! *Dalz.*

123! Achimota *Irvine* 1007! Prang (Jan.) *Vigne* 1555! Aframsu, Kwahu (Dec.) *Chipp* 593! **Togo:** Lome (Apr.) *Warnecke* 119! 378! (See Appendix, p. 68.)

9. **E. togoensis** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 288 (1899). A shrub, pale-pilose on young branchlets and petioles ; in savannah.
Togo: near Bismarckburg (Feb.) *Buettner* 413.

10. **E. gilgii** *Engl. & v. Brehm.* l.c. 334 (1917). Shrub, or small tree, to 25 ft. high, on edge of forest in montane area.
Br.Cam.: Lakom, Bamenda, 6,000 ft. (fr. Apr.) *Maitland* 1486! 1661! Belo, Bamenda, 4,500 ft. (Apr.) *Maitland* 1705! [Identified from description—type not seen.] Also in French Cameroons.

11. **E. salacioides** *Laws. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 200 (1927) and in Kew Bull. 1928 : 219, partly (*Mann* 842 only). *E. salicifolia* Laws. in F.T.A. 2 : 437, not of DC. or Berg. A shrub or small tree ; flowers white.
S.L.: Bagroo R. (Apr.) *Mann* 842! Njala (Apr.) *Deighton* 2633! **Lib.:** Du R. (July) *Linder* 186!

12. **E. leonensis** *Engl. & v. Brehm.* l.c. 329 (1917) ; Aubrév. l.c. 87. *E. salacioides* Laws. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 200 (1927) and in Kew Bull. 1928 : 219, partly (excl. *Mann* 842). *E. rupestris* Engl. & v. Brehm l.c. 330 ; F.W.T.A., ed. 1, 1 : 199. *E. coronata* (incl. var. *macrophylla*) of A. Chev. Bot. 266, 267, not of Schum. & Thonn. *E. coronata* of F.W.T.A., ed. 1, 1 : 199, partly (French Guinea spec.). A shrub, with small white flowers ; often on rocky hills ; stunted and with very small leaves, resembling the European Box, in exposed sites.
Fr.G.: Kindia *Chev.* 13205! Labé (Apr.) *Chev.* 12345! **S.L.:** *Afzelius*! Sugar Loaf Mt. (Dec.–Apr.) *Barter*! *Sc. Elliot* 3963! 5770 ; *Dalz.* 933! Limba country (Apr.) *Sc. Elliot* 5542! 5476! 5483! 5622! Falaba (Mar.) *Sc. Elliot* 5156! Konnoh country *Burbridge* 503! Dodo (Apr.) *Deighton* 3903! Mano to Kailahun (Apr.) *Deighton* 3149! **Lib.:** Peahtah (Oct.) *Linder* 1113! **Iv.C.:** Mt. Dou *Aubrév.* 1068. **G.C.:** Kumasi *Vigne* 1933! (See Appendix, p. 68.)

13. **E. pobeguinii** *Aubrév.* Fl. For. C. Iv. 3 : 66, t. 266B (1936), French descr. only ; Aubrév. Fl. For. Soud.-Guin. 87. *E. calophylloides* of F.W.T.A., ed. 1, 1 : 200, partly (*Pobéguin* 819). *E. whytei* of Chev. Bot. 269, partly ; F.W.T.A., ed. 1, 1 : 199 partly (French Guinea spec.). Shrub or small tree, on mountains ; flowers white.
Fr.G.: Kouroussa (Sept.) *Pobéguin* 819! **S.L.:** Bintumane Peak, 5,400 ft. (Jan.) *T. S. Jones* 136! **Iv.C.:** Mt. Dou *Aubrév.* 1062.

14. **E. talbotii** *Keay* in Kew Bull. 1953 : 288. *Memecylon bakerianum* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 215 (1927) and in Kew Bull. 1928 : 222, not of Cogn. (1891). *Memecylon machairacme* of Bak. f. in Cat. Talb. 128, not of Gilg. A shrub.
S.Nig.: Oban *Talbot* 203!

15. **E. whytei** *Sprague* in J. Linn. Soc. 37 : 98 (1905) ; Stapf in Johnston Lib. 604 ; Chev. Bot. 269, partly (Ivory Coast spec.) ; Aubrév. Fl. For. C. Iv. 66, t. 266A. A glabrous shrub or small tree, by seashore, or in forest.
S.L.: Boma (Apr.) *Deighton* 3705! **Lib.:** Monrovia *Whyte*! Sinoe Basin *Whyte*! Beach at mouth of Junk R. (Feb.) *Cooper* 188! **Iv.C.:** Cavally estuary (Aug.) *Chev.* 19903 ; 19999. (See Appendix, p. 68.)

16. **E. afzelii** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 290 (1899). A shrub with slender pilose branchlets ; leaves smooth above.
S.L.: *Afzelius.*

17. **E. obanensis** *Bak. f.* in Cat. Talb. 30 (1913). *E. buchholzii* of F.W.T.A., ed. 1, 1 : 200, partly (*Talbot* 1722). Shrub, young parts with pale pinkish indumentum ; flowers white.
G.C.: Assuansi (Mar.) *Irvine* 1565! Adeibeba, Kumasi (Jan.) *Darko* 512! **S.Nig.:** Lagos (Feb.) *Barter* 2192! *Moloney* 26! *Dalz.* 1397! Ibadan (Jan.) *Meikle* 940! Mt. Orosun, Idanre (Jan.) *Brenan & Keay* 8683! Umuahia (Mar.) *Cousens* FHI 3832! Awgu (Nov.) *Jones* FHI 4823! Eket *Talbot* 3234! Oban *Talbot* 1651! 1722! **F.Po:** *Mann* 263!

18. **E. buchholzii** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 291 (1899). A shrub ; branchlets, petioles and flowers densely rusty-pilose ; fruit subglobose.
Br.Cam.: Mungo (young fr. Apr.) *Buchholz.*

19. **E. fernandopoana** *Engl. & v. Brehm.* l.c. 337 (1917). A shrub or tree ; up to 25–30 ft., with slender branchlets ; fruits subglobose on pedicels of ½ in.
F.Po: *Mann* 1439! On the beach *Mann* 269! Bokoko (Oct.) *Mildbr.* 6921.

20. **E. memecyloides** *Benth.*—F.T.A. 2 : 437 ; Chev. Bot. 267 ; Aubrév. Fl. For. C. Iv. 3 : 66. A shrub, apparently with simple straight stems from the ground, about 4 ft. long ; leaves coriaceous.
Lib.: Grand Bassa (fr. July) *T. Vogel* 96! R. Cess (Mar.) *Baldwin* 11274!

21. **E. kalbreyeri** *Engl. & v. Brehm.* l.c. 337 (1917). *E. dawei* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 200 (1927) ; Kew Bull. 1928 : 219. Shrub, 10 ft. high ; flowers white, in open spaces.
S.L.: Mata Kahun (Mar.) *Dawe* 454! Njala (Feb.) *Deighton* 2618! Naiawama, Njala (Apr.) *Deighton* 3734! Segbwema (Apr.) *Deighton* 3655! **Br.Cam.:** Mapanya, 2,000 ft. (Mar.) *Kalbreyer* 157!

22. **E. calophylloides** *DC.* Prod. 3 : 272 (1828) ; F.T.A. 2 : 437, partly (*Smeathmann* spec. only) ; Chev. Bot. 266 ; Aubrév. Fl. For. C. Iv. 3 : 64. A shrub, sometimes half scrambling, with rusty-downy twigs, coriaceous leaves, and small white flowers in dense axillary clusters ; fruit about ½ in. diam., densely covered with glandular warts.
Fr.G.: Konianké country (Feb.) *Chev.* 20831! **S.L.:** *Smeathmann*! Freetown (May) *Lane-Poole* 273! Limba, near Bafodeya (Apr.) *Sc. Elliot* 5465! Falaba (Apr.) *Sc. Elliot* 5548! *Aylmer* 53! Bonthe, Sherbro (Feb.) *Dalz.* 1010! Njala (Mar.) *Deighton* 1941! Yonibana (Nov.) *Thomas* 5219! **Lib.:** Monrovia (Nov.) *Whyte*! *Linder* 1519! Greenville (Mar.) *Baldwin* 11565! 11559! **Iv.C.:** *Aubrév.* 1639!

The following introduced species are cultivated in our area : *E. jambos* Linn., the Rose Apple from tropical America, and *E. malaccensis* Linn., the Malay Apple from tropical Asia.

Imperfectly known species.

1. **E. kameruniana** *Engl.* in Notizbl. Bot. Gart. Berl. 2 : 291 (1899). *E. hankeana* H. Winkl. in Engl. Bot. Jahrb. 41 : 283 (1908).
Br.Cam.: *Dusen* 9. Bibundi to Debundscha (Feb.) *Winkler* 1110.

2. **E. ledermannii** *Engl. & v. Brehm.* in Engl. Bot. Jahrb. 54 : 332 (1917).
Br.Cam.: Bagangu, Bamenda (Dec.) *Ledermann* 1877. Kumbo, Bamenda (Dec.) *Ledermann* 1997. Also in French Cameroons.

3. **E. dinklagei** *Engl. & v. Brehm.* l.c. 338 (1917).
Lib.: Jenneh (Apr.) *Dinklage* 2565.

4. **E. tabouensis** *Aubrév.* in Fl. For. C. Iv. 3 : 66, t. 266B (1936), French descr. only. Shrub or small tree of sea coast ; very close to *E. calophylloides* DC.
Iv.C.: Tabou *Chev.* 19965. *Aubrév.* 1281. Sassandra *Chev.* 17972.

5. **E.** sp. **A.** *E. calophylloides* of F.W.T.A., ed. 1, 1 : 200, partly (Nigerian spec.), not of DC. Shrub or small tree.
N.Nig.: Patti Lokoja (Apr.) *Elliott* 53! Jamata (Dec.) *Elliott* 220!

6. **E.** sp. **B.** Leaves oblanceolate, 8–14 cm. long, 2–3·5 cm. broad ; flowers apparently solitary.
S.Nig.: Kwa Falls (Mar.) *Brenan* 9234!

7. **E.** sp. **C.**
S.Nig.: Eket *Talbot*!

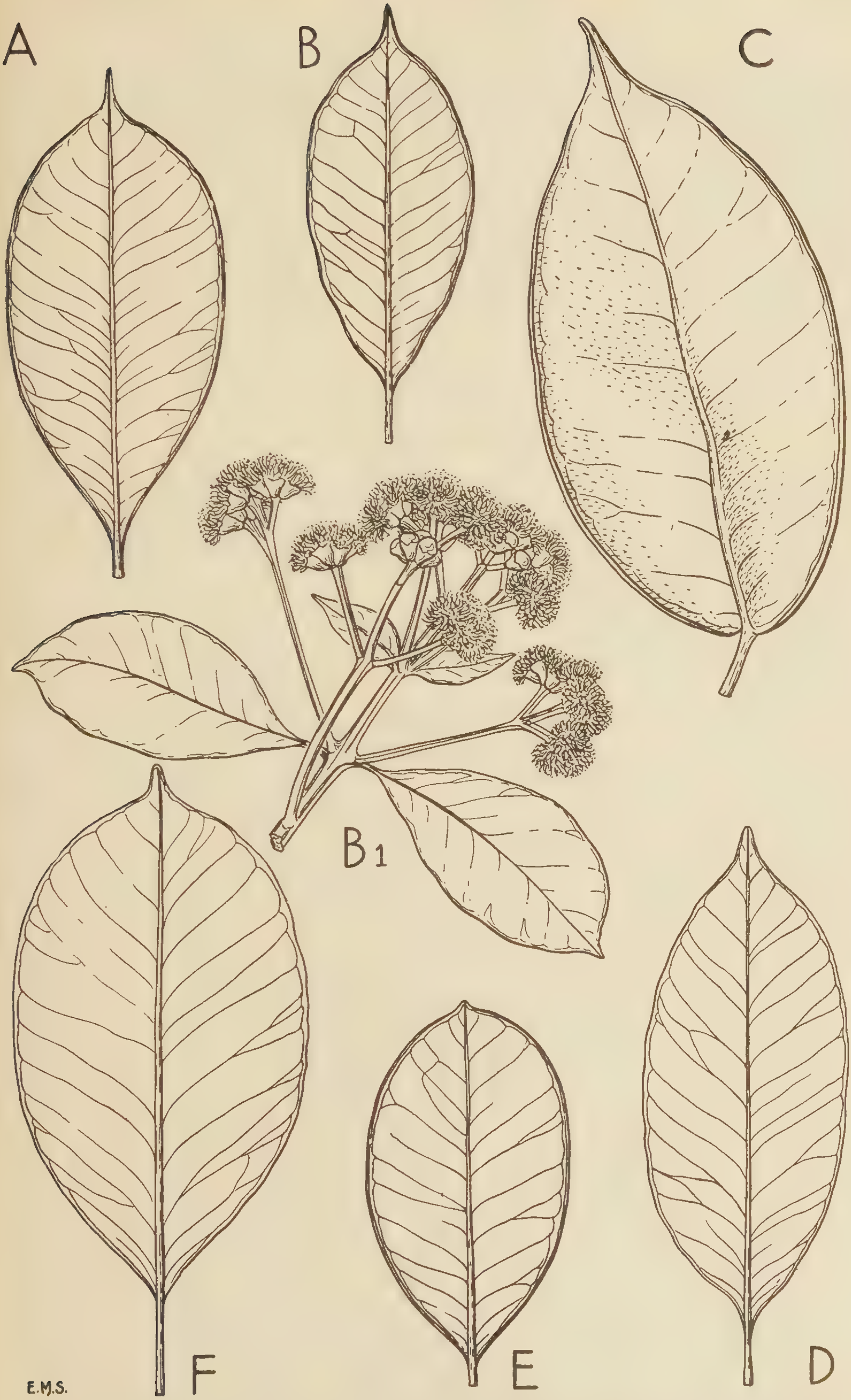

FIG. 95.—SYZYGIUM SPP. (MYRTACEAE).

A, *S. rowlandii* Sprague (*Rowland* 47). B & B1, *S. staudtii* (Engl.) Mildbr. (*Brenan* 9357). C, *S. owariense* (P. Beauv.) Benth. (*Meikle & Keay* 606). D, *S. guineense* (Willd.) DC. var. *guineense* (*Latilo* FHI 32955). E, *S. guineense* var. *littorale* Keay (*Debeaux* 346). F, *S. guineense* var. *macrocarpum* Engl. (*Meikle* 1085).
All $\times \frac{2}{3}$.

2. SYZYGIUM Gaertn. Fruct. 1 : 166, t. 33 (1788).

Leaves oblong-ovate, broadest below the middle, rounded or obtuse at base, long-acuminate, 7–17 cm. long ; 4–7 cm. broad ; margin inrolled ; lateral nerves usually rather obscure beneath, more prominent above ; petiole 4–8 mm. long ; flowers 3–4 mm. diam., in small, crowded, terminal inflorescences ; fruit subglobose, about 1·2 cm. diam. ; in swamp forest .. .. 1. *owariense*

Leaves broadest at or above the middle, cuneate or rarely obtuse at the base ; nerves more or less prominent beneath :

Flowers 5–6 mm. diam. ; inflorescence terminal, with stout square branches ; young stems square and slightly winged ; leaves oblong-obovate, cuneate at base, rather abruptly long-acuminate, 7–18 cm. long, 3·5–9 cm. broad ; lateral nerves prominent above and beneath ; petiole 6–8 (–12) mm. long ; fruit 2 cm. long and 1·6 cm. broad, or more ; by rivers in forest regions .. .. 2. *rowlandii*

Flowers usually 3–4 mm. diam., if more then branches of inflorescence and young stems not winged (see No. 4a) :

Branches of inflorescence and young stems square and slightly winged ; leaves obovate-elliptic or elliptic, cuneate at base, shortly and obtusely acuminate (more longly acuminate in Ivory Coast and Liberian specimens), 4–9 cm. long, 1·5–4 cm. broad ; petiole 6–12 mm. long ; flowers 3–4 mm. diam. ; in montane forest 3. *staudtii*

Branches of inflorescence and young stems, not winged, more or less terete :

Tree usually in fringing forest and on stream banks in savannah regions, usually with tall stem ; flowers 3–4 mm. diam., in laxly branched terminal inflorescences with long peduncles ; leaves narrowly elliptic to oblong-elliptic, cuneate at base ; acute to acuminate at apex, 6–16 cm. long, 2–7 cm. broad ; petiole 0·5–2 cm. long ; fruit ellipsoid, about 1 cm. long .. .. 4. *guineense* var. *guineense*

Savannah shrub or small tree, fire-tolerant ; flowers 4–5 mm. diam., usually in lateral, as well as in terminal, well-branched inflorescences, often on leafless stems ; leaves broadly elliptic to obovate-elliptic, long-cuneate at base, shortly acuminate, 7–15 cm. long, 3·5–7·5 cm. broad ; petiole 1–4 cm. long ; fruit subglobose, about 1·5 cm. long .. .. 4a. *guineense* var. *macrocarpum*

Tree of low spreading habit, or shrub, on the sea coast ; flowers 3–4 mm. diam. in rather small, crowded, terminal inflorescences ; leaves very coriaceous, broadly elliptic to obovate-elliptic or suborbicular, obtuse or cuneate at base, rounded or obtuse at apex or very shortly and obtusely acuminate, 7–11 cm. long, 4–6 cm. broad ; margin markedly inrolled ; petiole 3–6 (–10) mm. long ; fruit ellipsoid, about 1 cm. long .. .. 4b. *guineense* var. *littorale*

1. **S. owariense** (*P. Beauv.*) *Benth.* in Fl. Nigrit. 359 (1849). *Eugenia owariensis* P. Beauv. Fl. Oware 2 : 20, t, 70 (1810) ; F.T.A. 2 : 438, partly. *Jambosa owariensis* (P. Beauv.) DC. Prod. 3 : 287 (1828). *S. guineense* of F.W.T.A., ed. 1, 1 : 201, partly. *S. guineense* var. *palustre* Aubrév. Fl. For. C. Iv. 3 : 70, t. 268B (1936). *S. rowlandii* of F.W.T.A., ed. 1, 1 : 201, partly. Tree to 50 ft. high, or perhaps more, with stilt roots ; in freshwater swamp forest by creeks and rivers not far from the coast ; calyx pale green with red margin, stamens white ; fruits dark purple when ripe, said to be edible.
   S.L.: near mouth of Scarcies R. (young fr. Feb.) *A. P. D. Jones* SLFD 653 ! **Lib.:** Grand Bassa (July) *T. Vogel* 111 ! **Iv.C.:** Dabou *Chev.* 16201 ! **S.Nig.:** Eba Isl. (Jan.) *Thornewill* 240 ! R. Jamieson, Sapoba (fl. Aug.–Nov., fr. Nov.) *Kennedy* 229 ! 1685 ! 2801 ! *Symington* FHI 5696 ! *Meikle & Keay* 606 ! Warri *Beauvois* ! Degema *Talbot* ! Also in Gabon. (See Appendix, p. 69.)
2. **S. rowlandii** *Sprague* in Bull. Herb. Boiss., Sér. 2, 5 : 1170 (1905). *S. abidjanense* Aubrév. & Pellegr. in Aubrév. Fl. For. C. Iv. 3 : 68, t. 267 (1936), French descr. only. Tree to 50 ft. high (with low buttresses *fide* Cooper), low-branching, on river banks in forest ; flowers white.
   S.L.: Bandajuma *Burbridge* 477 ! Jala (Jan.) *Aylmer* 570 ! Mattru to Gbangbama (Nov.) *Deighton* 2368 ! Gorahun (Dec.) *Deighton* 3802 ! **Lib.:** Kakatown *Whyte* ! Grand Bassa (Oct.) *Dinklage* 1843 ! Dukwia R. *Cooper* 382 ! St. Paul R., Boporo (Dec.) *Baldwin* 10632 ! **Iv.C.:** Abidjan *Aubrév.* 209 ! Banco (Nov.) *Aubrév.* 495 ! Upper Cavally (Dec.) *Aubrév.* 2097 ! Beriby (Aug.) *Chev.* 20023 ! **S.Nig.:** Lagos *Rowland* 47 ! Oron to Eket *Talbot* 3022 ! Cross River, Itu (Jan.) *Cons. of Forests* 11 ! (See Appendix, p. 69.)
3. **S. staudtii** (*Engl.*) *Mildbr.* Wiss. Ergebn. 1910–11, 2 : 188 (1922) ; Keay in Kew Bull. 1953 : 288. *S. guineense* var. *staudtii* Engl. in Mildbr. Wiss. Ergebn. 1907–8, 2 : 582 (1913) ; Engl. Pflanzenw. Afr. 3, 2 : 738 (1921). *S. montanum* Aubrév. l.c. 3 : 70, t. 268A (1936), French descr. only, not of (Wight) Thw. (1859), nor of Gamble (1919). Tree of mountain forest, to 50 ft. high, with a dense tangle of adventitious roots at the base of the stem ; calyx green, filaments white.
   Lib.: top of Mt. Wolagwisa, Pandami, 4,500 ft. (Mar.) *Bequaert* 103 ! **Iv.C.:** Mt. Tonkoui *Aubrév.* 1000 ! Mt. Nimba (Mar.) *Aubrév.* 1139 ! **Br.Cam.:** Cam. Mt., 6,500–7,500 ft. (Feb., Mar.) *Maitland* 987 ! *Brenan* 9357 ! Johann-Albrechtshöhe *Staudt* 491 ! Lakom, Bamenda, 6,000 ft. (May) *Maitland* 1510 ! Bagangu, Bamenda *Johnstone* 6 ! L. Oku, 6,000–7,000 ft. *Johnstone* 1/31 ! **F.Po:** 4,500–6,400 ft. *Mildbr.* 7132 ; 7145*a* (?). Also in French Cameroons.
4. **S. guineense** (*Willd.*) *DC.* var. **guineense**—DC. Prod. 3 : 259 (1828) ; Guill. & Perr. Fl. Seneg. 1 : 315, t. 72 ; Aubrév. Fl. For. C. Iv. 3 : 68 ; Aubrév. Fl. For. Soud.-Guin. 87, t. 14, 4. *Calyptranthes guineensis* Willd. Spec. Pl. 2 : 974 (1800).[1] Tree to 50 ft. high, usually with a tall stem usually in fringing forest and on stream banks in savannah regions ; fruits grey when ripe, not edible ; flowers often galled.
   Sen.: *Perrottet* 344 ! Richard Tol (May) *Döllinger* 54 ! Cayor *Heudelot* ! Walo *Heudelot* ! **Gam.:** *Park* ! *Whitfield* ! *Hayes* 537 ! *Saunders* 10 ! **Fr.Sud.:** Macina (May) *Lean* 12 ! **Fr.G.:** Kadé *Maclaud* 318. Mamou *Cochet* 60. **S.L.:** *Afzelius* ! Scarcies R., Wallia (fr. Feb.) *Sc. Elliot* 4272 ! Dantilia (Mar.) *Sc. Elliot* 5297 ! Kamakwie (Feb.) *Deighton* 4213 ! **Iv.C.:** *Aubrév.* 1070 ! Bondoukou *Aubrév.* 747. **G.C.:** *Isert* ! Grube (Mar.) *Rea* 1669 ! Navrongo (Apr.) *Vigne* 3760 ! R. Volta (Apr.) *Anderson* 29 ! *Kitson* ! **Togo:** Yendi (Apr.) *Dalz.* 59 ! Kratchi (June) *Brent* 549 ! **N.Nig.:** Sokoto (Feb.) *Ryan* 13 ! *Lely* 830 ! Nupe *Barter* 1124 ! Zungeru (Mar.) *Elliott* 55 ! Zaria (Mar.) *Weir* 22 ! Kachiya to Kaduna (Feb.)

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[1] The type of this species is *Isert* s.n., in Hb. Willdenow.

Meikle 1202! **S.Nig.:** Alagbede F.R. (Feb.) *Latilo* FHI 32955! Idanre Hills *Brenan & Keay* 8657! **Br.Cam.:** Fonfuka (fr. May) *Maitland* 1363! Widespread in tropical Africa. (See Appendix, p. 69.)

4a. **S. guineense** var. **macrocarpum** *Engl.* Pflanzenw. Afr. 3, 2 : 738 (1921) ; Aubrév. Fl. For. C. Iv. 2 : 67, t. 268F (1936) ; Aubrév. Fl. For. Soud.-Guin. 87, t. 14, 1–3. Fire-tolerant savannah tree or shrub, to 30 ft. high ; fruits purple when ripe, edible ; flowers often galled.

Gam.: Foni *Dawe* 85! **Fr.Sud.:** Guélia (Feb.) *Chev.* 312! **Fr.G.:** Landoumas *Heudelot* 669! Kouroussa (Jan.) *Pobéguin* 143! **S.L.:** Mt. Gonkwi, Talla Hills (Feb.) *Sc. Elliot* 4834! Batkanu (Jan.) *Deighton* 3589! Musaia (fl. Feb., fr. Apr.) *Deighton* 4178! 5400! Bintumane, 5,000 ft. (Jan.) *Glanville* 465! **Iv.C.:** Tafiré *Aubrév.* 850! **G.C.:** Nkwantanang, Kwahu (Jan.) *Chipp* 636! Jagalo to Tokali (fl. & fr. Mar.) *Kitson* 712! Abofuo (Feb.) *Vigne* 1804! **Togo:** *fide* Engl. *l.c.* **N.Nig.:** Funtua (Feb.) *Foster* 10! Kontagora (Dec.–Jan.) *Dalz.* 70! *Meikle* 1085! Bauchi Plateau (Jan.) *Lely* 82! P. 5! **S.Nig.:** Lagos *Foster* 16! Olokemeji F.R. (Jan.) *A. F. Ross* 52! Udi (Nov.) *Ejiofor* FHI 24681! **Br.Cam.:** *Johnstone* 279/32! Munkep, Bamenda (Feb.) *Johnstone* 65! Widespread in tropical Africa.

4b. **S. guineense** var. **littorale** *Keay* in Kew Bull. 1953 : 289. *S. littorale* Aubrév. Fl. For. C. Iv. 3 : 70, t. 268B (1936), French descr. only, not of (Blume) Amshoff (1945). Tree of low-spreading habit, to 35 ft. high, or shrub, on the sea coast ; fruit violet, edible.

Iv.C.: Assinie (Mar.) *Chaper*! *Chev.* 17868! Abidjan *Aubrév.* 902! **G.C.:** Newtown (July) *Chipp* 280! Atwabo (fl. & fr. Feb.) *Irvine* 2343! **Togo:** Lome *Warnecke* 111! **Dah.:** Cotonou (Apr.) *Debeaux* 346! **S.Nig.:** Lagos *Barter* 2193! *Moloney* 18! *Millen* 40! Oni *Sankey* 6! Bonny (Feb.) *Kalbreyer* 51! Eket (Apr.) *Talbot* 3090! *Amachi* FHI 24307! **F.Po:** on the beach *Mann* 270! 1432! Also in French Cameroons and Gabon.

Besides the above indigenous species, *S. cumini* (Linn.) Skeels (syn. *Eugenia jambolana* Lam.) has been introduced into cultivation.

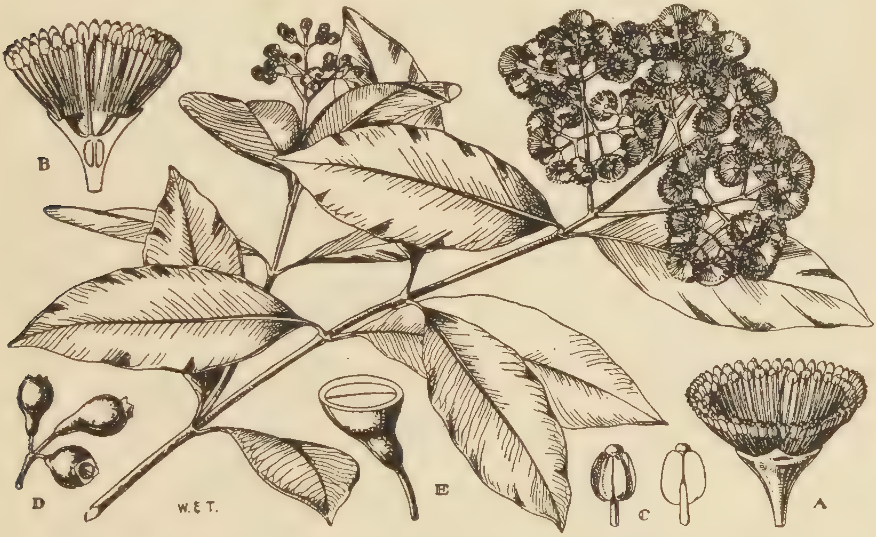

FIG. 96.—SYZYGIUM GUINEENSE (*Willd.*) *DC.* var. GUINEENSE (MYRTACEAE).

A, flower with corolla removed. B, the same in vertical section. C, anthers, front and back, showing gland at tip of connective. D, fruits. E, cross-section of fruit.

67. LECYTHIDACEAE

Trees or shrubs ; leaves simple, alternate, not gland-dotted but sometimes with large glands on the margin ; stipules absent. Flowers usually rather large and showy, actinomorphic or zygomorphic, hermaphrodite. Calyx 4–6-lobed, lobes valvate or imbricate. Petals 4–6, free or united into a campanulate tube and then with many ribs. Stamens numerous, in several series, sometimes the outer ones modified into staminodes and resembling a corona ; filaments mostly united ; anthers basifixed or rarely adnate, opening at the side by slits ; staminal disk sometimes lobed. Ovary inferior or semi-inferior, 2- or more-celled ; style mostly simple ; ovules 1 to many on axile placentas, sometimes pendulous from near the apex of the cells. Fruit woody, fibrous or fleshy, indehiscent or operculate at the apex. Seeds without endosperm ; embryo divided or entire.

Petals 4, free from each other ; fruits with large membranous wings ; anther-cells divergent . . . . 1. **Combretodendron**
Petals united into a broad campanulate many-ribbed often spreading tube ; fruits not winged ; anther-cells parallel :

Corona absent ; stamens very numerous, in several series ; filaments filiform ; ovary nearly superior .. .. 2. **Crateranthus**

Corona present (probably formed of staminodes), in 2 series, the outer linear or thread-like, spreading, the inner ascending or erect, of broader petaloid segments ; fertile stamens in a single series, with broad flat filaments ; ovary inferior ; leaves with small marginal glands or a pair at the base ; fruit like a pomegranate 3. **Napoleona**

1. COMBRETODENDRON A. Chev. Vég. Util. 5 : 151 (1909). *Petersia* Welw. ex Benth. & Hook. f. (1867) ; F.T.A. 2 : 438 ; F.W.T.A., ed. 1, 1 : 204 ; not of Klotzsch (1861).

A tree, up to 40 m. high ; leaves obovate, acutely acuminate, long-cuneate at base, 10–16 cm. long, 5–7·5 cm. broad, thin, obscurely toothed, glabrous, often with large pits in the axils of the lateral nerves ; petiole short, puberulous ; flowers several in a short panicle ; pedicels about 2 cm. long, jointed below the middle ; calyx-lobes rounded and shortly ciliate ; petals 4, glabrous ; fruit almost orbicular, emarginate, 4–5 cm. broad, 4-winged, wings membranous and reticulately veined, the principal nerves spreading at a right angle .. .. *africanum*

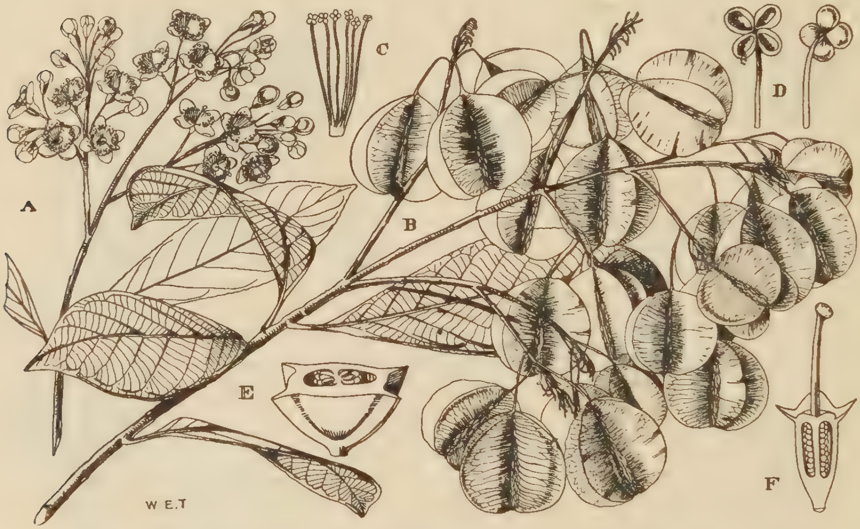

FIG. 97.—COMBRETODENDRON AFRICANUM (*Welw. ex Benth. & Hook. f.*) *Exell* (LECYTHIDACEAE).

A, inflorescence. B, fruiting branch. C, bundle of stamens. D, stamens, front and back. E, cross-section of fruit. F, vertical section of ovary.

C. africanum (*Welw. ex Benth. & Hook. f.*) *Exell* in J. Bot. 68 : 182 (1930) ; Knuth in Engl. Pflanzenr. Barringtoniac. 60 (1939). *Petersia africana* Welw. ex Benth. & Hook. f. Gen. Pl. 1 : 721 (1867) ; F.T.A. 2 : 439 ; F.W.T.A., ed. 1, 1 : 202 ; Aubrév. Fl. For. C. Iv. 3 : 35. *Combretodendron viridiflorum* A. Chev. Vég. Util. 5 : 150 (1909). *Petersia viridiflora* (A. Chev.) A. Chev. l.c. 5 : 301 (1909). *Petersianthus africanus* (Welw.) Merr. in Philipp. Journ. Sci. 11 : 201 (1916). Rain forest tree with tall straight bole ; bark with anastomosing fissures.

Fr.G.: Kissi *Chev.* **S.L.:** Pendembu, Manoa (fr. July, Aug.) *Dawe* 542 ! Neama, Javi (fr. Feb.) *Deighton* 3891 ! Gola North (Nov.) *King* 293 ! **Lib.:** Ganta (fr. Feb.) *Baldwin* 11030 ! **Iv.C.:** Bouroukrou (Dec.–Jan.) *Chev.* 16102 ! Abidjan *Aubrév.* 203 ! **G.C.:** Mpraeso (fr. Jan.) *Brent* 399 ! E. Akim (June) *Johnson* 885 ! Abetifi (fl. & fr. June) *Thompson* 78 ! Dunkwa (fr. Aug.) *Chipp* 719 ! **S.Nig.:** Lagos *Punch* ! Benin *Unwin* 54 ! Uzuakoli (fr. Aug.) *Jones* FHI 513 ! Degema *Talbot* 3746 ! Also in French Cameroons, Gabon, Belgian Congo and Angola. (See Appendix, p. 69.)

2. CRATERANTHUS Bak. f. in Cat. Talb. 35, t. 5 (1913).

A tree, up to 36 m. high ; branchlets with broad foliaceous wings between the leaves ; leaves elongate-oblong-obovate, shortly and obtusely acuminate, unequally cordate at base, up to 40 cm. long and 12 cm. broad, thinly coriaceous, glabrous ; lateral nerves 10–18 pairs, looped and forming a crenate intramarginal nerve ; veins scarcely evident ; petiole very short and thick ; flowers axillary, subsessile, showy ; bracts in 2 series, leathery ; calyx deeply 3-partite, segments broadly obovate, very concave, about 2·5 cm. long, glabrous ; corolla widely campanulate, with numerous strong projecting ribs outside, about 3·5 cm. long .. .. *talbotii*

C. talbotii *Bak. f.* in Cat. Talb. 36, t. 5 (1913); Knuth in Engl. Pflanzenr. Barringtoniac. 65 (1939). A tall tree; in swamp forest; flowers showy; calyx leathery, with membranous margins; corolla crimson with paler margin.

S.Nig.: Oban *Talbot* 5! *5a*! 1643! Calabar-Mamfe Road, Oban (fr. Apr.) *Ejiofor* FHI 21878!

Baker distinguishes two varieties: var. *parvifolius*, with smaller, more obtuse leaves and rose-pink flowers; and var. *multibracteatus*, with more series of bracts.

3. NAPOLEONA P. Beauv.—F.T.A. 2: 439.

Trees and erect shrubs, much branched:

Flowers not paniculate:

Fruits deeply 5–10-lobed, 3·5–4·5 cm. diam., about 2 cm. long, deeply depressed at the apex (not known in No. 4); corolla unequally and rather deeply divided into several segments:

Flowers borne in fascicles on the old wood; calyx puberulous:

Flowers 5–10 in a cluster, 4–5 cm. diam., pale cream, mauve at the base of the inner corona; leaves narrowly oblong-lanceolate, rather oblique, rather abruptly long-acuminate, unequal at base, 12–20 cm. long, 3·5–5 cm. broad, with about 10 pairs of lateral nerves looped and forming a double marginal nerve; fruits about 10-lobed .. .. 1. *talbotii*

Flowers 10–30 in a cluster, 3–3·5 cm. diam., cream with mauve markings at the base of the inner corona; leaves oblong or oblong-oblanceolate, acuminate, 25–26 cm. long, about 6 cm. broad, with 7–9 pairs of looped lateral nerves; fruits about 5-lobed .. .. 2. *gascoignei*

Flowers axillary:

Calyx glabrous; corolla about 4 cm. diam.; leaves rather abruptly acuminate, oblong or oblong-oblanceolate, cuneate at base, 18–24 cm. long, 5–7 cm. broad, with about 8–9 pairs of lateral nerves; fruits 3·5–4 cm. diam., deeply lobed 3. *megacarpa*

Calyx puberulous and slightly rugose; corolla about 2·5 cm. diam.; leaves abruptly acuminate, rounded at base, 15–25 cm. long, 6–10 cm. broad; lateral nerves about 10 or more pairs, tertiary nerves numerous and parallel 4. *mannii*

Fruit not, or only slightly, lobed, and not, or only slightly, depressed at the apex; corolla mostly undivided, or shortly toothed on the margin; flowers mostly on leafy shoots and sometimes also on the older branches and trunk:

Calyx glabrous:

Outer linear rays of corona much shorter than the inner cup-shaped part; corolla deep red-purple with apricot-yellow edges, 3–4 cm. diam.; leaves with marginal glands near the petiole only; leaves oblong-elliptic to oblong-obovate, generally rather narrowly cuneate at base, 10–18 cm. long, 3·5–8 cm. broad; fruit depressed subglobose, 4·5–6 cm. diam., 3·5–4 cm. long .. .. .. 5. *heudelotii*

Outer linear rays of corona about as long as the inner cup-shaped part; corolla cream-yellow with purple lines, dark red at the base within, 4–5·5 cm. diam.; leaves with marginal glands and sometimes teeth on each side below the acumen, as well as near the petiole; leaves oblong-elliptic to obovate-oblong, generally rather broadly cuneate or obtuse at base, 14–28 cm. long, 3·5–12 cm. broad; fruit depressed subglobose, about 4–4·5 cm. diam., 3–3·5 cm. long 6. *imperialis*

Calyx puberulous:

Calyx warted; leaves long-caudate-acuminate; acumen 1·5 cm. long, rather spathulate at apex; lamina oblong, shortly cuneate at base, about 12 cm. long and 4 cm. broad; laxly reticulate; lateral nerves looped well within the margin; corolla 2·2–2·5 cm. diam.; fruits smooth, about 4·5 cm. diam. and 3·5 cm. long 7. *parviflora*

Calyx not warted; acumen not spathulate; corolla 3–4·5 cm. diam.; fruit rugose:

Leaves abruptly rather long-acuminate, oblong, 10–15 cm. long, 4–6 cm. broad, laxly reticulate beneath; lateral nerves prominently looped within the margin, with a secondary marginal nerve outside; corolla about 3 cm. diam. 8. *leonensis*

Leaves shortly acuminate, broadly elliptic, shortly cuneate at base, 8–12 cm. long, 4–6 cm. broad, rather closely reticulate beneath; lateral nerves ascending within the margin; corolla about 4 cm. diam. .. .. .. 9. *vogelii*

Flowers paniculate on the older wood; calyx warted outside and tomentellous; leaves obovate, abruptly and very acutely acuminate; subacute at base, up to 18 cm. long and 7–8 cm. broad, shining above, laxly reticulate beneath, with about 5 pairs of lateral nerves .. .. 10. *egertonii*

Lianes or scandent shrubs, sparingly branched:

Calyx glabrous; flowers axillary; leaves obovate-elliptic, obtuse at base, 15–20 cm. long, 6–9 cm. broad, with 2 small glands towards the base of the acumen; fruit depressed subglobose, up to 5 cm. diam. and 3·8 cm. long .. .. 11. *lutea*

Calyx puberulous; flowers in dense clusters on the older branchlets; leaves oblong-elliptic, rounded at base, 15–20 cm. long, 5–8 cm. broad.. .. 12. *reptans*

1. **N. talbotii** *Bak. f.* in Cat. Talb. 32, t. 4, 1–2 (1913) ; Knuth in Engl. Pflanzenr. Barringtoniac. 72 (1939). A tree with slightly angled branchlets.
S.Nig.: Oban (Aug.) *Talbot* 190 ! 195 ! 198 ! Also in French Cameroons.

2. **N. gascoignei** *Bak. f.* l.c. 33 (1913) ; Knuth l.c. 73. A tree ; fruit about 1¼ in. diam.
S.Nig.: Obutong Road, Oban *Talbot* 1223.

3. **N. megacarpa** *Bak. f.* l.c. 31 (1913) ; Knuth l.c. 69. Apparently a tree, with angled branchlets ; flowers sometimes in the older axils.
S.Nig.: Oban *Talbot* 194 ! 197 ! **Br.Cam.:** Barombi (Sept.) *Preuss* 560 ! Ossidinge *Rudatis* 110. Also in French Cameroons and Gabon.

4. **N. mannii** *Miers* in Trans. Linn. Soc., Ser. 2, 1 : 11 (1875) ; Knuth l.c. 69. A tree, 20–25 ft. with rather strong pale striate branches and large leaves ; corolla yellow ; corona white.
F.Po: *Mann* 590 ! Bokoko *Mildbr.* 6819.

5. **N. heudelotii** *A. Juss.* in Ann. Sci. Nat., Sér. 3, 2 : 227, t. 4 (1844) ; Chev. Bot. 269, partly ; Knuth l.c. 69. *N. whitfieldii* Lem. in Flores des Serres 4 : t. 386–7 (1848) ; Knuth l.c. 69. A small tree ; often in regrowth forest.
Fr.G.: Fouta Djalon *Heudelot* 748 ! Rio Nunez *Heudelot* ! **S.L.:** *Whitfield* ! Daragbe, Samu (Dec.) *Sc. Elliot* 4299 ! Kambia (Dec.) *Smythe* 96 ! *Deighton* 927 ! Njala (fl. Dec., fr. May) *Deighton* 2642 ! 4694 ! Magbile (Dec.) *Thomas* 6409 !

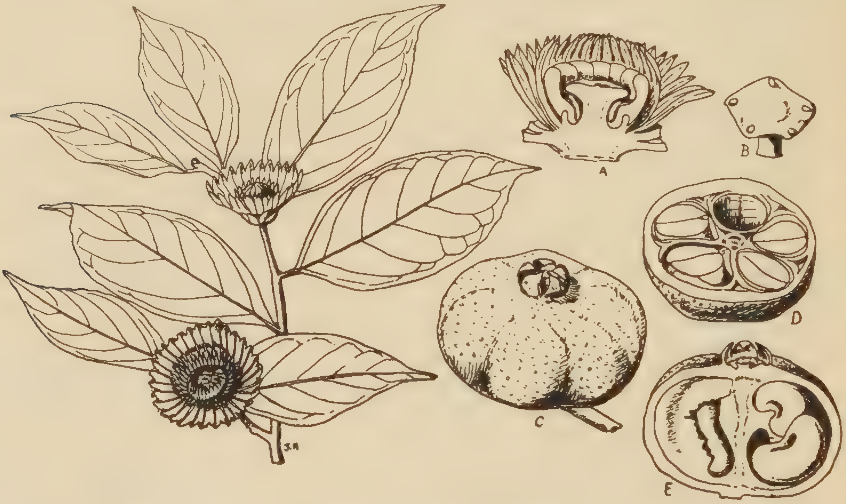

FIG. 98.—NAPOLEONA VOGELII *Hook. & Planch.* (LECYTHIDACEAE).
A, vertical section of flower. B, style and stigma. C, fruit. D, cross-section of fruit. E, vertical section of fruit. Partly after Hook. Ic. Pl.

6. **N. imperialis** *P. Beauv.*[1] Fl. Oware 2 : 30, t. 78 (1810) ; Miers l.c. 7 ; F.T.A. 2 : 439, partly ; Knuth l.c. 70. *N. cuspidata* Miers l.c. 10 (1875) ; F.W.T.A., ed. 1, 1 : 204 ; Knuth l.c. 70 ; Brenan in Kew Bull. 1950 : 213. *N. miersii* Hook. f. Bot. Mag. t. 7199 (1891) ; F.W.T.A., ed. 1, 1 : 204 ; Knuth l.c. 69. *N. alexandri* Talb. & Bak. f. in Cat. Talb. 31 (1913) ; Knuth l.c. 70. Tree to 20 ft. high in understorey of forest ; flowers in axils of older leaves and on old wood.
N.Nig.: Patti Lokoja (Feb.–Apr.) *Elliott* 38 ! 50 ! *Dalz.* 90 ! Agaie (Nov.–Mar.) *Yates* 33 ! Wamba (Feb.) *Thornewill* 46 ! **S.Nig.:** Lagos (Dec.–Mar.) *Barter* 2144 ! *Dalz.* 1182 ! 1399 ! Idanre Hills (Jan.) *Brenan* 8646 ! Warri *Beauvois* ! Usonigbe F.R. (Nov.) *Meikle* 573 ! Ubulu (Jan.) *Thomas* 2274 ! Degema *Talbot* 3765 ! Eket *Talbot* 3109 ! 3174 ! 3179 ! Omokku, Ahoada (Aug.) *Talbot* 3801 ! Calabar (Feb.) *Mann* 2272 ! Oban *Talbot* 997*a* ! 1400 ! Bebi, Obudu (Dec.) *Keay & Savory* FHI 25014 ! Also in French Cameroons, Belgian Congo and Angola.

7. **N. parviflora** *Bak. f.* l.c. 30 (1913) ; Knuth l.c. 71. A tree with pale angled branchlets ; flowers small, with the innermost whorl of the corona not bent outwards.
S.Nig.: Indokka Road, Oban *Talbot* 72 ! 193 !

8. **N. leonensis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 204 (1927) ; Kew Bull. 1928 : 220 ; Aubrév. Fl. For. C. Iv. 3 : 36, t. 257 ; Knuth l.c. 72. *N. heudelotii* of Chev. Bot. 269, partly, not of A. Juss. A small tree ; flowers rather pale-reddish, solitary in the axils.
Fr.G.: Bowali, Kouria (Nov.) *Chev.* 15054 ! **S.L.:** Talla Hills (Feb.) *Sc. Elliot* 4892 ! Commendi (Nov.) *Aylmer* 621 ! **Lib.:** Gbanga (Oct.) *Linder* 1236 ! Dukwia R. (Oct.) *Cooper* 86 ! **Iv.C.:** *Aubrév.* 78 !

9. **N. vogelii** *Hook. & Planch.* in Hook. Ic. Pl. t. 799–800 (1848) ; Chev. Bot. 270 ; Knuth l.c. 72. A shrub or tree, up to 50 ft. ; flowers axillary, or sometimes on the old wood ; in riverain forest and near seashore.
S.L.: Scarcies, Wallia (Feb.) *Sc. Elliot* 4554 ! R. Kora (fr. Feb.) *Sc. Elliot* 4798 ! Sulima (Jan.) *Deighton* 5310 ! Njala (fl. Nov., fr. Mar.) *Deighton* 1429 ! 4711 ! 4915 ! **Lib.:** Cape Palmas (July) *T. Vogel* 45 ! Monrovia (Nov.) *Linder* 1533 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Prestea (Oct.) *Vigne* 234 ! Fiapere (Feb.) *Chipp* 86 ! Kumasi (Oct.) *Vigne* 1382 ! **Togo:** *Kersting* A. 630 ! **S.Nig.:** Lagos *Foster* 26 ! *Punch* ! Olokemeji (Nov.) *A. F. Ross* 28 ! Ibadan (Dec.) *Meikle* 903 !

10. **N. egertonii** *Bak. f.* l.c. 33, t. 4, 3–4 (1913) ; Knuth l.c. 73. A tree, to 40 ft. high ; flowers white.
S.Nig.: *Rosevear* 11/30 ! Oban *Talbot* 997 ! **Br.Cam.:** Atolo, Mamfe (Jan.) *Jeme* FHI 2019 !

11. **N. lutea** *Bak. f. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 204 (1927) ; Kew Bull. 1928 : 220 ; Knuth l.c. 70. Liane, stems to 60 ft. long ; with whorls of 5–6 radiating twigs at intervals along the stem ; corolla apricot-yellow, not split, rays of corona very short, pistil bright mauve.
S.Nig.: Eket *Talbot* 3173 !

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[1] Beauvois described and illustrated this species as having azure-blue flowers and said that it was common in the forest near Warri. The colouring of flowers in several other plates of Beauvois' Fl. Oware has, however, been proved to be grossly incorrect, and no specimen of a *Napoleona* has since been found with blue flowers.

12. **N. reptans** *Bak. f. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 204 (1927) ; Kew Bull. 1928 : 220 ; Knuth l.c. 72. Scandent shrub or liane, stems to 20 ft. long ; corolla pale-apricot and white ; pistil pale mauve. **S.Nig.:** Eket *Talbot* 3175 !

68. MELASTOMATACEAE [1]

Herbs, shrubs or trees ; branches opposite. Leaves simple, opposite or verticillate, mostly with 3 to 9 longitudinally parallel nerves ; stipules 0. Flowers hermaphrodite, mostly very showy, actinomorphic. Calyx tubular, free or adnate to the ovary, or sometimes connected to it by septa-like strands ; lobes imbricate or rarely valvate. Petals imbricate, free, rarely united at the base. Corona sometimes present. Stamens the same to double the number of the petals ; filaments free, often geniculate, inflexed ; anthers 2-celled, opening by a pore at the apex or rarely by a slit (*Memecylon*), connective often appendaged at the base. Ovary mostly inferior, 1- to many-celled ; style simple ; ovules numerous, axile, or rarely basal or parietal. Fruit a capsule or berry. Seeds minute, without endosperm.

A large tropical family, easily recognized by the opposite exstipulate leaves often with very marked parallel main nerves, geniculate stamens, anthers opening by pores and usually inferior ovary.

Excluded genus : *Ditinnia rupicola* A. Chev. Bot. 279 = *Remusatia vivipara* Schott (Araceae).

*Ovary 3–5-celled with numerous ovules ; fruit with numerous small seeds ; flowers usually fairly large and showy ; anthers opening by a pore and mostly fairly long ; mostly herbaceous or shrubby :
†Stamens with equal and similar anthers, or slightly unequal in size only but not in structure :
‡Stems well-developed :
Ovary completely free from the calyx-tube .. .. .. 1. **Nerophila**
Ovary partially or wholly adnate to the calyx-tube :
Ovary without a ring of bristles or scales on the top :
Anther-connective without an appendage .. .. .. 2. **Guyonia**
Anther-connective with one or two appendages :
Calyx with distinct and persistent lobes .. .. 3. **Tetraphyllaster**
Calyx subtruncate :
Flowers very numerous in dense globose heads borne on the woody stem below the leaves ; calyx-tube constricted above the ovary 4. **Myrianthemum**
Flowers in terminal, relatively lax, cymes ; calyx-tube campanulate or funnel-shaped, not constricted above the ovary :
Ovary half-adherent, calyx-tube campanulate .. .. 5. **Phaeoneuron**
Ovary completely adherent to the funnel-shaped calyx-tube 12. **Preussiella**
Ovary with a ring of bristles or scales on the top :
Ovary with a ring of bristles on the top ; calyx-lobes well-developed :
Calyx-lobes with alternating supplementary lobes :
Flowers 4-merous ; connective with two adhering short but well-marked appendages ; flowers capitate .. .. 6. **Antherotoma**
Flowers 5-merous ; connective without appendages ; flowers paniculate, or capitate .. .. 7. **Osbeckia**
Calyx-lobes without alternating supplementary lobes :
Flowers in many-flowered lax panicles, not enclosed by bracts ; connective long-produced .. .. 8. **Sakersia**
Flowers solitary or capitate, surrounded by bracts ; connective not produced :
Ovary completely adhering to the calyx-tube ; anthers with short anterior appendage only ; seeds rounded with a flattened side .. 9. **Tristemma**
Ovary adhering to the calyx-tube only at the base ; anthers with short dorsal appendage as well as 2 linear anterior appendages ; seeds elongate 10. **Cailliella**
Ovary with a cup or ring of scales on the top ; calyx-tube truncate or undulately lobed :
Calyx-tube and fruit strongly 5–10-angled ; anther-connective with a single anterior appendage only .. .. 11. **Calvoa**
Calyx-tube terete, anther-connective with a dorsal as well as one or two anterior appendages :
Leaves long-petiolate ; connective with single appendage .. 12. **Preussiella**
Leaves subsessile ; connective with 2 appendages .. .. 13. **Medinilla**

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[1] I am much indebted to M. Jacques-Félix of Nogent-sur-Marne and to J. P. M. Brenan of Kew for their criticism and advice on many points in the revision of this family.—R.W.J.K.

‡Acaulescent herb with rounded tuber ; leaves 3–6, broadly ovate to ovate-lanceolate, on long slender petioles ; flowers solitary on long slender pedicels 14. **Bourdaria**

†Stamens with very unequal anthers, the connective of the larger ones always long-produced at the base and with 1–2 basal appendages :

Ovary with a cup of scales on the top, which crown the fruit 15. **Amphiblemma**

Ovary without a cup of scales on the top :

Calyx-tube subtruncate, lobes not well-developed :

Flowers in congested racemes ; fruit angled or winged at the top ; connective of the larger stamens with 2 anterior appendages and a short dorsal spur 16. **Dicellandra**

Flowers in lax panicles ; fruit ellipsoid, smooth, fleshy ; connective of the larger stamens without a dorsal spur .. .. 17. **Dinophora**

Calyx-lobes well-developed :

Ovary 3-celled, linear .. .. 18. **Adamea**

Ovary 4–5 celled, with the calyx-tube, more or less campanulate, not linear 19. **Dissotis**

*Ovary 1-celled, completely adnate to the calyx-tube ; seeds large and solitary or few ; anthers very short, opening by a longitudinal slit ; trees and shrubs 20. **Memecylon**

1. NEROPHILA Naud.—F.T.A. 2 : 441.

Herb, about 15–20 cm. high, with few scattered leaves ; leaves sessile, ovate, obtuse, about 1 cm. long, crenulate, sparingly setose on the upper surface, faintly 3-nerved ; flowers 1–3 in a head surrounded by 4 leaves ; calyx-tube glabrous ; lobes lanceolate, ciliate, with alternate setose teeth ; petals obovate ; anthers 3 mm. long *gentianoides*

N. gentianoides *Naud.*—F.T.A. 2 : 441 ; Gilg in Engl. Monogr. Afr. Melastom. 4, t. 1A ; Chev. Bot. 271. A herb chiefly of damp places, with small yellow flowers ; petals 4.
Sen.: in marshes of R. Senegal *Heudelot* 668 ! **Fr.G.:** Kindia (Sept.) *Farmar* 214 ! Mt. Loura, 4,500 ft. *Jac.-Fel.* 2006. Dinguiraye *Jac.-Fel.* 1470. **S.L.:** Bintumane Peak, 5,400–6,390 ft. (Jan.) *T. S. Jones* 83 ! 101 !

2. GUYONIA Naud.—F.T.A. 2 : 443 ; Jac.-Fel. in Bull. Soc. Bot. Fr. 97 : 225 (1950). *Afzeliella* Gilg in Engl. Monogr. Afr. Melastom. 4 ; F.W.T.A., ed. 1, 1 : 205.

Stems, leaves and calyx quite glabrous ; stems creeping with ascending branches ; leaves obovate, finely crenulate, 8–13 mm. long and almost as broad, narrowed to the 4–6 mm. long petiole ; flowers 5-merous, terminal or axillary, solitary ; calyx-lobes lanceolate, subacute, quite glabrous ; petals ovate-oblong, 4 mm. long ; ripe fruit 3 mm. long .. .. 1. *tenella*

Stems, leaves and calyx setose ; stems creeping, rooting at the nodes ; leaves ovate-rhomboid, subacute, 10–15 mm. long, nearly 10 mm. broad, crenulate, petiole nearly as long as the blade, slender ; flowers 4–5-merous, terminal or terminating short lateral leafy branchlets, subsessile ; receptacle glabrous, calyx-lobes filiform with long setose hairs ; petals up to 8 mm. long ; ripe fruit 5–6 mm. long 2. *ciliata*

1. **G. tenella** *Naud.*—F.T.A. 2 : 443 ; Gilg in Engl. Monogr. Afr. Melastom. 4, t. 1B ; Jac.-Fel. in Bull. Soc. Bot. Fr. 97 : 225 (1950). Slender annual, in moist places by streams.
Fr.G.: Fouta Djalon *Heudelot* 858.

2. **G. ciliata** *Hook. f.* in F.T.A. 2 : 443 (1871) ; Jac.-Fel. l.c. *Afzeliella ciliata* (Hook. f.) Gilg l.c. 5 ; Chev. Bot. 272 ; F.W.T.A., ed. 1, 1 : 205. *G. intermedia* Cogn. in De Wild. & Th. Dur. Pl. Thonner 30, t. 16 (1900) ; Jac.-Fel. in Bull. Mus. Hist. Nat. Sér, 2, 7 : 367 (1935). *Afzeliella intermedia* (Cogn.) Gilg in Meck. Deuts. Zent. Afr. Exp. 582 (1913). *G. gracilis* A. Chev. Bot. 272. *Afzeliella sp. aff. ciliata* of E. Guinea in Bol. Real. Soc. Esp. Hist. Nat. 49 : 185, 186 (1951). Weak annual, petals mauve ; by streams, in shade, or epiphytic.
Fr.G.: Dalaba Plateau (Oct.) *Chev.* 18737. Kissi (Feb.) *Chev.* 20756. Kindia *Jac.-Fel.* 179. Macenta *Jac.-Fel.* 857. **S.L.:** Waterloo *Burbridge* 153 ! Yetaya (Sept.) *Thomas* 2392 ! York Pass (Dec.) *Deighton* 3308 ! Lowoma (Apr.) *Deighton* 3678 ! Baoma, Koya (Apr.) *Deighton* 3665 ! **Lib.:** Gbanga (Sept.) *Linder* 584 ! Kolubanu (Oct.) *Linder* 1119 ! **Iv.C.:** Sassandra Basin (May) *Chev.* 16363 ; 17987. Cavally Basin (Apr., July) *Chev.* 19553 ; 21345. **Br.Cam.:** above Buea, 4,000 ft. (Nov.) *Migeod* 26 ! **F.Po:** Balachá (Jan.) *Guinea* 1457 ! Moka (Dec.) *Boughey* 66 ! Also in French Cameroons, Belgian Congo and Uganda.

3. TETRAPHYLLASTER Gilg in E. & P. Pflanzenfam. Nachtr. 266 (1897).

Herb ; leaves long-petiolate, ovate, shortly acuminate, acute, 4–6·5 cm. long, 1·5–3 cm. broad, more or less densely hairy beneath, 5-nerved ; flowers solitary, terminal, sessile ; bracts broadly ovate, ciliate, 7–8 mm. long ; receptacle smooth ; sepals ovate, persistent .. .. *rosaceum*

T. rosaceum *Gilg* in E. & P. Pflanzenfam. Nachtr. 266 (1897) ; Engl. Monogr. Afr. Melastom. 34, t. 8A. An erect hairy herb, with fairly large rose flowers.
Br.Cam.: Buea, 3,000–5,000 ft. (Jan., Sept.) *Preuss* 702 ; *Dundas* FHI 15308 !

4. MYRIANTHEMUM Gilg in E. & P. Pflanzenfam. Nachtr. 266 (1897).

A glabrous climbing shrub ; branches terete ; lower leaves alternate, upper verticillate, obovate-elliptic, acute or shortly acuminate, entire, 15–30 cm. long, 5–13 cm. broad, 5-nerved at base, nerves impressed above and prominent beneath ; flowers very numerous in a globose head up to 13 cm. in diam. ; pedicels slender, 3·5 cm. long ; calyx truncate, constricted above the ovary ; petals 4, obovate .. .. *mirabile*

M. mirabile *Gilg* in Engl. Monogr. Afr. Melastom. 33, t. 7 (1898). Including var. *dentatum* Bak. f. in Cat. Talb. 128. Slender liane ; cauliflorous with globose bunches of very numerous flowers ; pedicels and ovaries red ; petals pink.

S.Nig.: Oban *Talbot* 587 ! 1325 ! **Br.Cam.:** Maune River F.R., Mamfe (May) *Tamajong* FHI 22144 ! **F.Po:** St. Isabel Peak, 2,000–2,500 ft. *Mildbr.* 6292. Also in French Cameroons and Gabon.

5. **PHAEONEURON** Gilg in E. & P. Pflanzenfam. Nachtr. 267 (1897).

Leaves oblong-lanceolate, obtuse or slightly rounded at base, acutely acuminate, 5–10 cm. long, 2–3 cm. broad, slightly puberulous on the 3 main parallel nerves ; tertiary nerves almost at right angles ; inflorescence nearly glabrous ; stamens unequal .. .. 1. *setosum*

Leaves ovate or ovate-elliptic, rounded or cordate at base, subacute at apex, up to 16 cm. long and 9 cm. broad, puberulous on the 5 main parallel nerves ; inflorescence rusty-tomentose ; stamens subequal .. .. 2. *dicellandroides*

1. **P. setosum** (*Hook. f.*) *Stapf* in J. Linn. Soc. 34 : 492 (1900). *Dicellandra ? setosa* Hook. f. in F.T.A. 2 : 459 (1871). *D. liberica* Gilg in Engl. Monogr. Afr. Melastom. 33. *P. libericum* (Gilg) Gilg in Engl. Pflanzenw. Afr. 3, 2 : 762. A shrub or undershrub, of moist places, the older branches stout, terete, longitudinally fissured ; petals 5, rose, up to 17 mm. long.

S.L.: *Afzelius* ! **Lib.:** Grand Bassa (Nov.) *Dinklage* 1767 ; 2056 !

2. **P. dicellandroides** *Gilg* in Engl. Monogr. Afr. Melastom. 35 (1898). *P. moloneyi* Stapf in Bot. Mag. t. 7729 (1900). *P. gracile* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 206, partly ; Kew Bull. 1928 : 220, partly. *Dicellandra gracilis* A. Chev. Bot. 276 (name only), partly ; Bull. Mus. Hist. Nat. Sér. 2, 4 : 679 (1932), partly. Herb or undershrub, to 5 ft. high ; older branches terete ; petals 5, pink, 10–12 mm. long ; in moist places.

Fr.G.: Nzérékoré *Jac.-Fel.* 1121. **S.L.:** Moselelo (fr. Nov.) *Deighton* 2390 ! Near Roruks (fr. July) *Deighton* 4673 ! **Lib.:** *Linder* ! **Iv.C.:** Dyolas country, Danané (Apr.) *Chev.* 21206 ! **S.Nig.:** Lagos *Moloney* 28 ! Okomu F.R. (Dec., Feb.) *Brenan* 8478 ! 9005 ! Also extends through French Cameroons and Shari to Angola, Congo and E. Sudan.

6. **ANTHEROTOMA** Hook. f.—F.T.A. 2 : 444.

An annual herb ; stems appressed-setose ; leaves few, shortly petiolate, lanceolate, acute, 3–4 cm. long, 0·5–1·2 cm. broad, crenate, setose above and only on the nerves beneath, 3-nerved ; flowers in a close terminal cluster subtended by leaves ; pedicels about 3 mm. long ; calyx-tube laxly setose, lobes narrowly lanceolate, stellately bristly at the top, with alternating narrower lobes ; anther-connective produced at the base into 2 short lobes ; ovary bristly at apex.. .. .. .. *naudini*

A. naudini *Hook. f.* in F.T.A. 2 : 444 (1871) ; Gilg in Engl. Monogr. Afr. Melastom. 9, t. 1F. Annual, to 1 ft. high ; petals 4, pink or mauve. Very similar to *Osbeckia decandra* (Sm.) DC. but distinguished by the 4-merous flowers and connectives with well-developed appendages.

Fr.G.: Farana *Jac.-Fel.* 2086 ! Dalaba (Nov.) *Jac.-Fel.* 573 *bis* ! **N.Nig.:** Bauchi Plateau : Naraguta (Aug.) *Lely* 536 ! Vom *Dent Young* 93 ! Panyam (Sept.) *Lely* 728 ! Sho (Nov.) *Keay* FHI 21450 ! **Br.Cam.:** Jua, Bamenda (Apr.) *Maitland* 1497 ! Widespread in tropical Africa and in Natal and Madagascar.

7. **OSBECKIA** Linn.—F.T.A. 2 : 441.

Calyx-tube elongated above after anthesis into a tube, reaching 3·5–5 mm. long ; calyx-lobes broadly lanceolate, caducous ; lower part of calyx about 8 mm. in fruit, densely covered with long-stalked stellate hairs ; flowers in flexuous cymes, shortly pedicellate ; petals 4–6 mm. long ; leaves ovate, distinctly petiolate, rounded at base, acute at apex, 1·5–7 cm. long, 0·7–3·2 cm. broad, crenulate, 5-nerved, long-pilose on both surfaces .. .. 1 *tubulosa*

Calyx-tube not elongated above after anthesis :

Anthers short, thick, truncate at apex, connective scarcely produced below the anther ; sepals persistent, triangular :

Leaves ovate to elliptic-oblong, sparsely pilose ; anthers straight, 1 mm. long, shorter than the filaments .. .. 2. *decandra*

Leaves lanceolate, densely villous ; anthers twisted, 2·5 mm. long, almost as long as the filaments .. .. 3. *praviantha*

Anthers linear, acuminate, connective produced below the anther :

Sepals persistent in fruit :

Petals mauve or pink, about 6 mm. long and 4 mm. broad ; stems, leaves and calyx long-setose ; leaves narrowly oblong-elliptic, about 2–5 cm. long and 1 cm. broad ; fruits subglobose, setose-pilose .. .. 4. *congolensis*

Petals yellow, 18 mm. long and 8 mm. broad ; calyx glandular pubescent ; stems sparsely appressed pilose ; leaves ovate, 2–2·2 cm. long, 1–1·2 cm. broad, shortly petiolate, appressed strigose pubescent .. .. 5. *porteresii*

Sepals caducous in fruit, bristly at the tips ; leaves about 3 cm. long, 1 cm. broad, 3-nerved, setulose-pubescent beneath ; fruit contracted below the top, 10-ribbed and finely setose .. .. 6. *senegambiensis*

1. **O. tubulosa** *Sm.*—F.T.A. 2 : 442 ; Gilg in Engl. Monogr. Afr. Melastom. 9, t. 1E ; Chev. Bot. 271. Erect annual, to 18 in. high, with 4-angled reddish stems ; petals mauve or pink.

Fr.Sud.: Koulikoro (Oct.) *Chev.* 2078 ! **Fr.G.:** *Farmar* 167 ! Dalaba-Diaguissa Plateau, 3,000–4,000 ft.

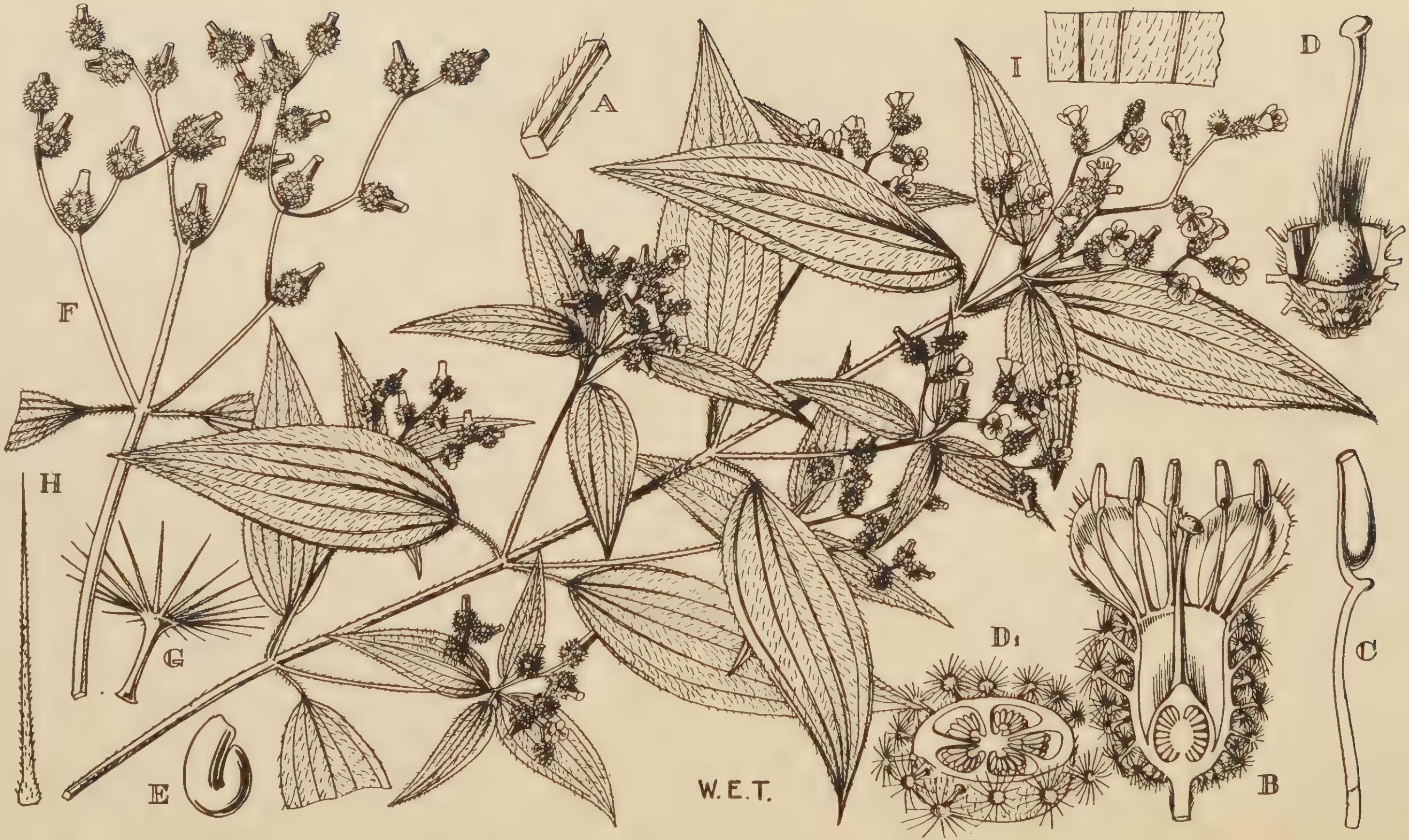

FIG. 99.—OSBECKIA TUBULOSA *Sm.* (MELASTOMATACEAE).

A, portion of stem. B, vertical section of flower. C, stamen. D, ovary and style. D1, cross-section of ovary. E, embryo. F, fruiting branch. G, stellate-bristly scale from calyx-tube. H, bristle. I, under-surface of leaf.

(Oct.) *Chev.* 18701. Grand Chutes (Dec.) *Chev.* 20235. **S.L.:** *Afzelius*! *Don*! *T. Vogel* 4! *Barter*! *Sc. Elliot* 3828! Sherbro Isl. (Nov.) *Hunter*! Masingbi (Feb.) *Deighton* 4064! **Lib.:** Kakatown *Whyte*! **Togo:** Misahöhe (Nov.) *Mildbr.* 7313! **N.Nig.:** Patti Lokoja (Nov.) *Dalz.* 84! Panshanu (Sept.) *Lely* 606! Jos (Nov.) *Keay* FHI 21434! **S.Nig.:** Idanre (Oct.) *Keay* FHI 22680!

2. **O. decandra** (*Sm.*) *DC.* Prod. 3: 143 (1828); Gilg l.c. 7; Keay in Kew Bull. 1952: 164. *O. zeylanica* var. *decandra* Sm. (1813). *O. afzelii* (Hook. f.) Cogn. in DC. Monogr. 7: 300 (1891); Gilg l.c. 6, t. 1C. Jac.-Fel. in Bull. Mus. Hist. Nat. Sér. 2, 7: 370 (1935). *Antherotoma afzelii* Hook. f. in F.T.A. 2: 444 (1871). Slender herb 4–8 in. high; petals 5, pink-mauve. Very similar to *Antherotoma naudini* Hook. f. but distinguished by the 5-merous flowers and connectives without appendages.
Fr.G.: Kindia *Jac.-Fel.* 190. Pita *Jac.-Fel.* 669. Macenta *Jac.-Fel.* 1089. **S.L.:** *Afzelius*! Tower Hill, Freetown (Oct.) *Deighton* 2514! Near Mapaki, N.P. (Aug.) *Deighton* 1296! Bumbuna to Farangbaia (Sept.) *Deighton* 5147! Rokupr (Nov.) *Jordan* 153! Sasa (Sept.) *Jordan* 321!

3. **O. praviantha** *Jac.-Fel.* in Bull. I.F.A.N. 15: 973, fig. 1 (1953). Erect herb, to 18 in. high; flowers light pink; on rock outcrops.
Fr.G.: Macenta (Oct.) *Jac.-Fel.* 1238! *Adam* 6747! **Lib.:** Kolahun, W. Prov. (Nov.) *Baldwin* 10147!

4. **O. congolensis** *Cogn. ex Büttn.* in Verh. Bot. Brand. 31: 95 (1889); Gilg l.c. 6; Chev. Bot. 270–1. *O. senegambiensis* of Chev. l.c., not of Guill. & Perr. In damp sand or marshy places, to 18 in. high; flowers mauve.
Fr.Sud.: Tabacco (Jan.) *Chev.* 139. Gourma (July) *Chev.* 24313. **Fr.G.:** Kollangui (Mar.) *Chev.* 12879! Farana (Jan.) *Chev.* 20507! **S.L.:** Falaba (Mar.) *Sc. Elliot* 5172! Yetaya (Sept.) *Thomas* 2321! Kabala (Feb., June) *Deighton* 3739! 4155! **Iv.C.:** Orodougou, Sassandra (June) *Chev.* 21811. Also in Gabon, Congo, Uganda, Tanganyika and Angola.

5. **O. porteresii** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 10: 630 (1938). Bushy herb, woody at the base, to 1 ft. high.
Fr.G.: Nimba Mt., 4,800–5,800 ft. (Nov.) *Portères* 3175! *Jac.-Fel.* 1933!

6. **O. senegambiensis** *Guill. & Perr.*—F.T.A. 2: 443; Gilg l.c. 8. *O. saxicola* of Chev. Bot. 271, not of Gilg. Stems erect from a woody rootstock, branched, stout, 4-angled, 12–18 in. high.
Sen.: near Cape Verde (Mar.) *Döllinger*! Casamance, Zinguinchor (Jan.) *Chev.* 3015. **Fr.G.:** Gaoual *Jac.-Fel.* 709!

8. SAKERSIA Hook. f.—F.T.A. 2: 458.

Branches of the inflorescence glabrous except for a few bristles at the nodes; panicle lax-flowered; flowering when leafless; calyx-tube glabrous outside, except for the ciliate broad lobes; petals ciliate; branches with very thick long-bristly nodes; leaves elliptic, slightly cuneate at base, about 11 cm. long and 4·5 cm. broad, petiole 1·5 cm. long .. .. 1. *echinulata*

Branches of the inflorescence densely bristly; panicle many-flowered; petals glabrous; flowering when leafy:

Calyx-tube glabrous outside except at the base; branches shortly bristly; leaves elliptic or oblong-elliptic, rounded at base, subacutely acuminate, 6–12 cm. long, 3–6 cm. broad, sparingly setose, petiole about 1 cm. long .. 2. *africana*

Calyx-tube densely bristly all over; branches densely brown setose; leaves ovate to ovate-elliptic, rounded to deeply cordate at base, obtuse at apex, 6–16 cm. long, 3–7 cm. broad, shortly setose on both surfaces, petiole 1–2 cm. long 3. *calodendron*

1. **S. echinulata** *Hook. f.* in F.T.A. 2: 458 (1871); Gilg in Engl. Monogr. Afr. Melastom. 32, t. 5F; Chev. Bot. 276. *S. mirabilis* A. Chev. Tree, to 20 ft. high, producing mass of pink blossom when leafless.
Fr.G.: Conakry (Jan.) *Dalz.* 8379! Between Mamou and Dalaba (Mar.) *Dalz.* 8380! Labé (Apr.) *Chev.* 12393! **S.L.:** *Afzelius*. Kofiu Mt., Scarcies (Jan.) *Sc. Elliot* 4599!

2. **S. africana** *Hook. f.* in F.T.A. 2: 458 (1871); Gilg l.c. 32; Chev. Bot. 276. Tree, to 50 ft. high, in moist places; flowers produced in great quantity, with the leaves; petals rose-pink.
S.L.: Dodo Hills (Jan.) *Sawyerr* FHK 13596! **Iv.C.:** Tabou (Apr.) *Aubrév.* 1666! Grabo (July) *Chev.* 19651! **S.Nig.:** Oban *Talbot* 1347! Netim, Calabar (Jan.) *Espley* 13! Ikom *Catterall* 16! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 2205! Also in French Cameroons, Spanish Guinea, Gabon and Cabinda.

3. **S. calodendron** *Gilg & Ledermann* in Engl. Pflanzenw. Afr. 3, 2: 759 (1921). Tree, to 30 ft. high, by streams; flowers very numerous, with the leaves; petals magenta-pink.
Br.Cam.: Bamenda: Bum, 4,000 ft. (May) *Maitland* 1520! Ndop Plain (Dec.) *Collier* FHI 22208! Bambui, 4,500 ft. (Jan.) *Keay* FHI 28422! Also in French Cameroons.

9. TRISTEMMA Juss.—F.T.A. 2: 445.

Calyx-tube glabrous outside; branches sparingly setose, glabrescent below; leaves ovate-elliptic, rounded or subacute at base, 5–15 cm. long, 4–6 cm. broad, shortly appressed-setose above, almost glabrous beneath, 5-nerved .. 1. *littorale*

Calyx-tube with hairs outside in the upper half:

Hairs on the calyx-tube scattered, not in rings; stems long pilose-setose; leaves ovate or ovate-elliptic, somewhat rounded at base, acutely acuminate, 6–8 cm. long, 3–4 cm. broad, longly and shortly setose above and beneath, 5-nerved; petiole shaggy, 1–2 cm. long .. .. 2. *involucratum*

Hairs on the calyx-tube in one or more distinct rings, the rings sometimes discontinuous, especially as the ovary enlarges in fruit:

*Calyx-tube with 3 rings of bristly-hairs, or less:

Leaves 3-nerved, up to 4 cm. long and 2 cm. broad, ovate-elliptic, delicate, with long-silky petiole and lamina; stems procumbent below, ascending above; flowers 1–3 together; calyx-tube with a single ring of bristles 3. *radicans*

Leaves 5-nerved, usually well over 4 cm. long and 2 cm. broad, rather stiff:

†Stems and petioles shortly and often sparingly setose; petiole slender:

Calyx-tube with only one complete ring of bristles and with a second incomplete ring, or rarely with a single incomplete ring only; leaves broadly ovate-elliptic, rounded or shortly cuneate at base, 10–15 cm. long, 5–8 cm. broad, appressed-setose above, nearly glabrous beneath .. .. 4. *incompletum*

Calyx-tube with two complete rings of bristles, and sometimes a third, or parts of a third, ring ; leaves broadly ovate-elliptic, shortly cuneate at base, 7–15 cm. long, 3–8 cm. broad, appressed-setulose on both surfaces .. 5. *mildbraedii*

†Stems and petioles densely bristly-pilose with long shaggy hairs ; leaves ovate-elliptic, rounded at base, acutely acuminate, 8–12 cm. long, 4–6 cm. broad, longly and shortly setose on both surfaces ; petiole 1·5–3 cm. long, flattened ; bracts pilose-setose, calyx-tube with 2–3 rings of bristles .. .. .. 6. *hirtum*

*Calyx-tube with 4–6 rings of bristles ; flowers solitary, or few together ; stem and petiole shortly setose, leaves ovate-elliptic, somewhat rounded at base, subacute, 6–10 cm. long, 4–7 cm. broad, setulose on both surfaces, 5-nerved ; petiole slender, 1·5–2 cm. long .. .. 7. *coronatum*

1. **T. littorale** *Benth.* in Fl. Nigrit. 353 (1849) ; Gilg in Engl. Monogr. Afr. Melastom. 25. *T. papillosum* Gilg. *T. oreophilum* Gilg. *T. schumacheri* Guill. & Perr. var. *littorale* Hook. f.—F.T.A. 2 : 446. A prostrate or suberect undershrub, 3–5 ft. or more, stems obtusely angled, often wiry ; flowers pink to bluish-purple ; in wet places.
G.C.: Begoro, Akim (Apr.) *Irvine* 1359! **S.Nig.:** Lagos *Rowland*! Olokemeji *Foster* 297! Ibadan (Feb., Apr.) *Meikle* 1143! 1409! Ilesha *Foster* 174! Ajebandele (Mar.) *Jones* FHI 17203! Enugu (Aug.) *Jones* FHI 6562! **Br.Cam.:** Buea (Sept.) *Preuss* 961. Bibundi (Apr.) *Schlechter* 12407! **F.Po:** (June, Nov., Dec.) *T. Vogel* 90! *Mann* 61! *Barter*! Also in Ubangi-Shari, Congo and Principe.

2. **T. involucratum** *Benth.*—F.T.A. 2 : 445 ; Gilg l.c. 24, t. 1K. *Melastoma involucratum* D. Don (1823), not of Desv. (1797). Procumbent diffusely branched ; flowers solitary.
Fr.G.: Macenta *Jac.-Fel.* 875. **S.L.:** *Afzelius*! *Don*! *Barter*! **Iv.C.:** Teke near Azaguie (Aug.) *Favarger*!

3. **T. radicans** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 754 (1921) ; Mildbr. Wiss. Ergebn. 1910–11 : 189, name only. Small herb, procumbent below with ascending branches.
F.Po: above Musola *Mildbr.* 7037! Moka, 4,000 ft. (Dec.–Jan.) *Exell* 831! *Boughey* 78!

4. **T. incompletum** *R.Br.*—Gilg l.c. 25. *T. schumacheri* Guill. & Perr.—F.T.A. 2 : 446 ; Chev. Bot. 272. *T. albiflorum* (G. Don) Benth.—F.W.T.A., ed. 1, 1 : 208. *Dissotis talbotii* Bak. f. in Cat. Talb. 36. A low undershrub with strongly angled branches ; leaves often crimson beneath ; flowers pink to purple, or white ; usually in marshy places but sometimes amongst rocks.
Sen.: *Heudelot* 78! Bignona (Feb.) *Chev.* 3016. **Gam.:** *Ingram*! **Fr.G.:** Conakry (Feb.) *Chev.* 12243! Lola (June) *Collenette* 38! **S.L.:** *Don*! *Barter*! Freetown (June) *T. Vogel* 7! Sugar Loaf Mt. (Dec.) *Sc. Elliot* 4019! Male R. (Dec.) *Deighton* 3566! Potoru, Bari (Nov.) *Deighton* 5260! **Lib.:** Gbanga (Sept.) *Linder* 581! Dukwia R. (Oct.) *Cooper* 13! **Iv.C.:** several localities *fide* Chev. *l.c.* **G.C.:** Kumasi F.R. (Aug.) *Akwa* FH 1769! **Togo:** Bismarckburg (fl. all year) *Büttner* 191 ; 425. Misahöhe (May) *Baumann* 303. **N.Nig.:** Dekina (June) *Elliott* 240! **S.Nig.:** Ibadan (fl. & fr. Oct.) *Keay* FHI 13774! **Br.Cam.:** Rio del Rey *Johnston*! Buea, 4,000 ft. (Nov.) *Migeod*! **F.Po:** Musola (Jan.) *Guinea* 1061! Extends to Angola and E. Sudan.

5. **T. mildbraedii** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 755 (1921) ; Mildbr. Wiss. Ergebn. 1910–11 : 189, name only. Much-branched semi-woody herb, with erect branches to 3 ft. high ; petals pink.
S.Nig.: Okomu F.R. (Jan.) *Brenan* 8922! **F.Po:** Basilé, 1,900–2,600 ft. *Mildbr.* 6477!

6. **T. hirtum** *P. Beauv.* Fl. Oware 93, t. 57 (1806) ; Ventenat Choix des Plantes 35 (1808) ; F.T.A. 2 : 446 ; Gilg l.c. 26 ; Chev. Bot. 272. *T. dusenii* Gilg l.c. 27. A hirsute herb or undershrub, 3–4 ft.; flowers lilac to red ; in marshy places and waste lands.
Sen.: *Derrien*! **Lib.:** Kakatown *Whyte*! Monrovia (Nov.) *Dinklage* 3274! Du R. (July) *Linder* 210! **Iv.C.:** mouth of Cavally (Aug.) *Chev.* 19904. **G.C.:** Axim (Dec.) *Chipp* 51! **N.Nig.:** Kontagora (Nov.) *Dalz.* 81! Nupe *Barter* 1314! Vom *Dent Young* 101! **S.Nig.:** Lagos (Sept.) *Barter* 2171! *Millen* 131! *Dalz.* 1088! 1183! Benin (Sept.) *Farquhar* 80! *Beauvois.* Nun R. (Aug.) *T. Vogel* 39! Opobo (Sept.) *Holland* 136! **Br.Cam.:** Bibundi (Nov., Jan.) *Mildbr.* 10665! *Keay* FHI 28653! Mamfe (Nov.) *Tamajong* FHI 22119! **F.Po:** Moka (fr. Dec.) *Boughey* 3! Extending to Congo and Upper Shari.

7. **T. coronatum** *Benth.*—F.T.A. 2 : 446 ; Gilg l.c. 25, t. 1L ; Chev. Bot. 272. Half-prostrate herb, or undershrub, 1–3 ft. high ; flowers rose or white.
Fr.G.: Macenta *Jac.-Fel.* 1042. **S.L.:** *Don*! Gola Forest (Nov.) *Deighton* 373! **Lib.:** Nana Kru, Sinoe (Mar.) *Baldwin* 11587! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** S. Fomang Su (Oct.) *Brown* 351! Axim *Burton*! Kumasi *Cummins* 150! Akim *Irvine* 550! **Togo:** Amedjope (Mar.) *Williams* 80!

10. CAILLIELLA Jac.-Fel. in Bull. Mus. Hist. Nat. Sér. 2, 10 : 637 (1938).

Much-branched shrub ; branchlets terete, strigose ; leaves lanceolate, acute, 5–6 cm. long, 1·3–1·6 cm. broad, densely strigose on both surfaces, strongly 5-nerved, petiole 7–8 mm. ; flowers 5-merous, terminal, solitary, sessile, surrounded by the upper leaves and 2–3 pairs of bracts ; calyx-tube glabrous, 15 mm. long, with oblong, 7–8 mm. long, persistent lobes ; ovary half-adnate to calyx-tube ; petals obovate-truncate, 2 cm. long, 1·6 cm. broad ; stamens equal, connective not produced, with two well-developed anterior appendages ; seeds curved at apex, cuneate at base *praerupticola*

C. praerupticola *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 10 : 637 (1938). Shrub to 5 ft. high, flowering as the leaves fall.
Fr.G.: Benna massif, 2,900 ft. (Dec.) *Jac.-Fel.* 2139!

11. CALVOA Hook. f.—F.T.A. 2 : 457.

Stem and leaves densely hirsute ; leaves with 5 main nerves, ovate-elliptic, subcordate, not acuminate, 4–6 cm. long, 2–3·5 cm. broad, petiole up to 2 cm. long ; flowers subsessile, solitary to clustered ; calyx-tube strongly ribbed, subtruncate ; stamens 10, unequal ; ovary crowned with 5 persistent leathery broad. scales projecting beyond the calyx ; fruit crowned by the scales .. .. 1. *hirsuta*

Stem and leaves glabrous ; leaves with 3 main nerves :

Scales of the ovary projecting well above the calyx in fruit, venose, widely emarginate ; capsule obconical, 6–7 mm. long (including the projecting scales), 10-ribbed ; leaves elliptic to obovate, unequally sided at base, shortly acuminate, setose-denticulate on margin, 3·5–7 cm. long, 2–4·5 cm. broad ; flowers sessile on one side of the axis 2. *monticola*

Scales of the ovary included within the calyx-tube, even in fruit ; capsule long and narrowly obconical, 12 mm. long, strongly 5-angled with fainter intermediate ribs ; leaves ovate-elliptic, with a single seta at the obtuse apex and one seta on each margin in the upper half ; inflorescence a terminal scorpiod cyme with 5–7 flowers 3. *trochainii*

1. **C. hirsuta** *Hook. f.* in F.T.A. 2 : 457 (1871) ; Gilg in Engl. Monogr. Afr. Melastom. 32, t. 5E. Annual herb 5–10 in. high, in wet places in forest, on fallen trees, etc. ; petals white.
G.C.: Ankasa F.R., 200 ft. (Dec.) *Vigne* 3187 ! **F.Po:** 6,000 ft. *Mann* 285 ! Musola (Jan.) *Guinea* 1111 ! *Mildbr.* 6384 ; 7040.
2. **C. monticola** *A. Chev. ex Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 209 (1927) ; Kew Bull. 1928 : 221 ; Chev. Bot. 275, name only. Epiphyte, or terrestrial, in moist forest ; leaves fleshy, petals pink.
Fr.G.: Nzérékoré, 1,900 ft. (June) *Collenette* 37 ! Macenta *Jac.-Fel.* 900. **S.L.:** Gola Forest, Gaura (Dec.) *King* 91*b* ! **Lib.:** Gola Forest (June) *Bunting* ! Kassa Ta (Sept.) *Linder* 829 ! **Iv.C.:** Mt. Niénokué, 1,600 ft. (July) *Chev.* 19476 ! And other localities, *fide* Chev. *l.c.* **G.C.:** Begoro, Akim (Apr.) *Irvine* 1352 !
3. **C. trochainii** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 10 : 639 (1938), with fig. Branched epiphyte, 6–8 in. high ; leaves fleshy, petals pink.
Fr.G.: Ziama Forest, Macenta, *Jac.-Fel.* 1151. [An incomplete specimen from Fernando Po (*Guinea* 930 *bis*) appears to be close to *C. trochainii*, but has been given a provisional, and therefore invalid, name by E. Guinea in Bol. Real. Soc. Esp. Hist. Nat. 49 : 179, 182 (1951).]

Imperfectly known species.

C. sp. Possibly new.
Br.Cam.: Mamfe (Sept.) *Savory* 650 !

12. PREUSSIELLA Gilg in E. & P. Pflanzenfam. Nachtr. 267 (1897).

Ovary with a small cup on the top within the calyx ; flowers in short terminal cymes ; receptacle (including calyx-tube) about 5 mm. long ; petals 6–8 mm. long and 3–5 mm. broad ; leaves long-petiolate, ovate, slightly cordate and 5-nerved at base, shortly and gradually acuminate, 6–11 cm. long, 3·5–5 cm. broad .. .. 1. *kamerunensis*

Ovary without a cup on the top within the calyx ; flowers in dense terminal cymes of 40–80 flowers ; receptacle (including calyx-tube) about 7 mm. long ; petals about 12 mm. long and 8 mm. broad ; leaves long-petiolate, ovate, rounded and 5-nerved at base, acuminate, 9–17 cm. long, 5–9 cm. broad .. .. .. 2. *chevalieri*

1. **P. kamerunensis** *Gilg* in E. & P. Pflanzenfam. Nachtr. 267 (1897) ; Engl. Monogr. Afr. Melastom. 36, t. 9. Woody epiphyte, to 1 ft. high ; petals pale pink.
Lib.: Dukwia R., Monrovia (Apr.) *Cooper* 74 ! **Br.Cam.:** Elephant Lake, Barombi (Aug.) *Preuss* 442.
2. **P. chevalieri** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 10 : 641 (1938). Woody plant to 2½ ft. high. ephiphytic or on rocks ; petals pink.
Fr.G.: Ziama Forest, Macenta, 2,500 ft. (Sept.) *Jac.-Fel.* 1152 ! **Iv.C.:** Mt. Tonkui, 3,200 ft. (Oct.) *Jac.-Fel.* 1277 !

13. MEDINILLA Gaud.—F.T.A. 2 : 460.

A glabrous shrubby plant ; branches subterete, with thickened nodes ; leaves subsessile, lanceolate, rounded at base, long-acuminate, 7–11 cm. long, 1·5–2·5 cm. broad, 3-nerved, entire, glabrous ; cymes very small, few-flowered ; petals 4, white *mannii*

M. mannii *Hook. f.* in F.T.A. 2 : 460 (1871). Epiphyte, 4 ft. high.
F.Po: *Mann* 302 !

14. BOURDARIA A. Chev. in Bull. Mus. Hist. Nat. Sér. 2, 4 : 681 (1932) ; Brenan in Kew Bull. 1953 : 86.

Small herb with round tuber and short stem bearing 3–6 leaves ; petioles slender, 1·5–4·5 cm. long ; lamina broadly ovate to ovate-lanceolate, acute to subobtuse at apex, rounded or cordate at base, 2·5–6 cm. long, 1·2–3·8 cm. broad, crenulate to serrulate margins, 3-nerved, sparingly setose above, glabrous beneath ; pedicels slender, 5–22 on each rosette, shorter than leaves when flowers open, but elongating and reaching 5–9 cm. ; flowers 4-merous, petals 6–7 mm. long, calyx about 2 mm. long, shortly lobed, adnate to the ovary, sparingly pubescent or glabrescent ; capsule 4-angled, 3–4 mm. long and broad .. .. *felicis*

B. felicis *A. Chev.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 682 (1932). *Begonia*-like herb, epiphytic and on rocks with moss, in moist shaded situations ; petals pale pinkish-white.
Fr.G.: Kalifayagbé, Conakry, and Taouli, Kindia *Jac.-Fel.* 163. Benna massif, Kindia (June) *Jac.-Fel.* 1744 ! **S.L.:** Bumban, 1,200 ft. (June) *Glanville* 435 !

15. AMPHIBLEMMA Naud.—F.T.A. 2 : 455.

Fruiting cymes secund ; infructescence composed of 3–6 simple or sparingly branched more or less straight branches borne in a single whorl, with the fruits arranged secundly along the whole length of the branches ; young inflorescences compact, cymose, 3–5 cm. in diam., the branches elongating in fruit ; calyx-tube 4–5 mm. long, sparingly puberulous ; fruit 6–8 mm. long, reddish-brown ; stems puberulous, glabrescent ; leaves ovate, cordate at base, subacutely acuminate, 8–18 cm. long, 5–13 cm. broad, slightly setulose, 7–9-nerved at base, petiole up to half as long as the lamina .. .. 1. *cymosum*

Fruiting cymes not secund ; infructescence richly branched with the fruits borne towards the tips of the branches ; inflorescence a panicle of cymes, with 2–4 whorls of laxly branched branches, 5–7 cm. in diam. when young, but greatly elongating in fruit ; calyx-tube 5-7 mm. long, densely puberulous ; fruit 8–11 mm. long, yellowish-brown ; leaves similar to above, 8–14 cm. long, 4–12 cm. broad, densely puberulous on the nerves beneath .. .. 2. *mildbraedii*

1. **A. cymosum** (*Schrad. & Wendl.*) *Naud.*—F.T.A. 2 : 456 ; Gilg in Engl. Monogr. Afr. Melastom. 30. *Melastoma cymosum* Schrad. & Wendl. in Sert. Hannov. t. 10 (1796). *Calvoa superba* A. Chev. Bot. 275. Herb to 4 ft. high, sometimes epiphytic ; in moist places ; petals pink.
Fr.G.: Fouta Djalon (Sept.) *Chev.* 18501 ! 18528 ! Macenta *Jac.-Fel.* 1078. **S.L.:** *Barter* ! Regent (Apr.) *Sc. Elliot* 5825 ! Mayoso (Aug.) *Thomas* 1407 ! Njala (fr. Aug.) *Deighton* 3225 ! **Lib.:** Peahtah (Oct.) *Linder* 1015 ! **Iv.C.:** Zagoué to Soucourala (May) *Chev.* 21575 !

2. **A. mildbraedii** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 756 (1921) ; Mildbr. Wiss. Ergebn. 1910–11 : 188, name only. *A. cymosum* of F.W.T.A., ed. 1, 1 : 210, partly. Erect shrubby herb, to 7 ft. high ; petals deep pink.
N.Nig.: Naraguta (July, Aug.) *Lely* 544 ! P. 519 ! **S.Nig.:** Idanre (Oct.) *Keay* FHI 21571 ! Awgu (Sept.) *Jones* FHI 6176 ! **Br.Cam.:** above Widdikum, Bamenda (Jan.) *Keay* FHI 28326 ! **F.Po:** Musola *Mildbr.* 7055. Mioka, 5,000 ft. (Dec.) *Boughey* 92 ! Moka (Feb.) *Exell* 853 ! *Mildbr.* 7092.

16. **DICELLANDRA** Hook. f.—F.T.A. 2 : 459.

Stems sharply angled, roughly villous on the angles ; leaves ovate or ovate-orbicular, shortly acuminate, rounded or cordate at base, up to 25 cm. long and 15 cm. broad, 5–7-nerved with prominent tertiary nerves at right angles ; petioles up to 15 cm. long ; inflorescence cylindrical, about 6 cm. long .. .. *barteri*

D. barteri *Hook. f.* in F.T.A. 2 : 459 (1871) ; Gilg in Engl. Monogr. Afr. Melastom. 33 ; Stapf in J. Linn. Soc. 34 : 491. *Amphiblemma grandifolium* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 210 (1927) ; Kew Bull. 1928 : 221 ; Chev. Bot. 276, name only ; Bull. Mus. Hist. Nat. Sér. 2, 4 ; 678 (1932). An epiphyte, or herb of damp places ; stem stout, spongy, 10 ft., rooting at the nodes ; leaves often purple beneath ; flowers purple.
Lib.: Dukwia R. (Sept.) *Cooper* 365 ! Greenville, Sinoe (Mar.) *Baldwin* 11563 ! **Iv.C.:** between Fort Binger and Toula (July) *Chev.* 19541 ! Grabo (Aug.) *Chev.* 19710 ! **G.C.:** Tumfa Hills, Akim (Dec.) *Johnson* 50*b* ! Ankasa F.R. (Dec.) *Vigne* 3174 ! **S.Nig.:** Okomu F.R. (Feb.) *Brenan* 9006 ! Nun R. *Barter* 2113 ! Eket *Talbot* 3002 ! Oban *Talbot* 490 ! 1275 ! **F.Po:** (Dec.) *Mann* 3 ! Ureka *Guinea* 2320 ! Also in French Cameroons.

Imperfectly known species.

D. scandens *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 760 (1921) ; Mildbr. Wiss. Ergebn. 1910–11 : 188, name only. Described as differing from *D. barteri* Hook. f. in the lanceolate leaves, obtuse to only slightly cordate at base and in the long-bristly stems and petioles ; possibly not distinct.
F.Po : *Mildbr.* 6358.

17. **DINOPHORA** Benth.—F.T.A. 2 : 444.

A glabrous shrub with slender branches ; leaves sparse, ovate-oblong, cordate at base, acutely acuminate, 5–14 cm. long, 3–6 cm. broad, almost membranous, 5–7-nerved at base, serrate with mucronate teeth ; tertiary nerves almost at right angles, subparallel, rather distant ; flowers in lax terminal dichotomous panicles ; pedicels slender ; calyx-tube smooth, dentate ; petals ovate-lanceolate, about 1 cm. long ; stamens 10, subequal, the connective produced below and 2-lobed ; fruit broadly ellipsoid, with very thin walls, splitting irregularly .. .. .. *spenneroides*

D. spenneroides *Benth.*—F.T.A. 2 : 445 ; Gilg in Engl. Monogr. Afr. Melastom. 27, t. 1H. *Phaeoneuron gracile* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 206, partly ; Kew Bull. 1928 : 220, partly. *Dicellandra gracilis* A. Chev. Bot. 276, name only, partly ; Bull. Mus. Hist. Nat. Sér. 2, 4 : 679 (1932), partly. Delicate spreading shrub, to 12 ft. high ; flowers pink.
Fr.G.: Macenta *Jac.-Fel.* 931. Nzérékoré *Jac.-Fel.* 1100. **S.L.:** Baiyama, Barri (Sept.) *Deighton* 2231 ! **Lib.:** Du R. (Aug.) *Linder* 288 ! Fayapulu (Oct.) *Linder* 1138 ! Banga (Oct.) *Linder* 1257 ! **Iv.C.:** Grabo, Cavally Basin (July) *Chev.* 19635 ! And other localities, *fide* Chev. *l.c.* **S.Nig.:** Western Lagos (Aug.) *Rowland* ! Sapoba (fl. & fr. Nov.) *A. F. Ross* 219 ! *Kennedy* 2689 ! *Keay* FHI 22705 ! Eket *Talbot* ! **Br.Cam.:** Rio del Rey *Johnston* ! Between Kumba and Victoria (fl. & fr. Apr.) *Hutch. & Metcalfe* 142 ! **F.Po:** (Nov., Dec.) *T. Vogel* 189 ! Extends to Gabon and Congo.

18. **ADAMEA** Jac.-Fel. in Bull. Mus. Hist. Nat. Sér. 2, 23 : 661 (1952). *Adamia* Jac.-Fel. (1951), non Wall. (1824).

Sparsely branched glabrous herb, woody at base ; petiole up to 5 cm. long, lamina broadly ovate-elliptic, rounded to subcordate at base, apex obscurely acuminate, margin crenate, up to 5 cm. long and 3·5 cm. broad ; flowers in lax, few-flowered cymes, to 13 cm. long ; flowers sessile, with linear 3-celled ovary adnate to the calyx-tube except for the filiform apex within the upper part of the calyx-tube ; petals 4 mm. long ; larger stamens with 2 anterior and a single posterior appendage, smaller stamens without appendages .. .. *stenocarpa*

A. stenocarpa (*Jac.-Fel.*) *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 23 : 661 (1952). *Adamia stenocarpa* Jac.-Fel. l.c. 23 : 448, with fig. (1951). Herb, to 1 ft. high in moist places among rocks, with purple flowers.
Fr.G.: Mt. Konosso, 4,300 ft. (July) *Adam* 5579 !

19. **DISSOTIS** Benth.—F.T.A. 2 : 447.

*Flowers solitary to paniculate with inconspicuous or early deciduous bracts :
†Calyx-tube glabrous outside except sometimes for bristle-tipped processes between the calyx-lobes ; rarely with a few bristles near the base :
‡Calyx with accessory linear lobes between the sepals :
Leaves more or less densely setose-pilose on both surfaces with a distinct setose-pilose petiole :

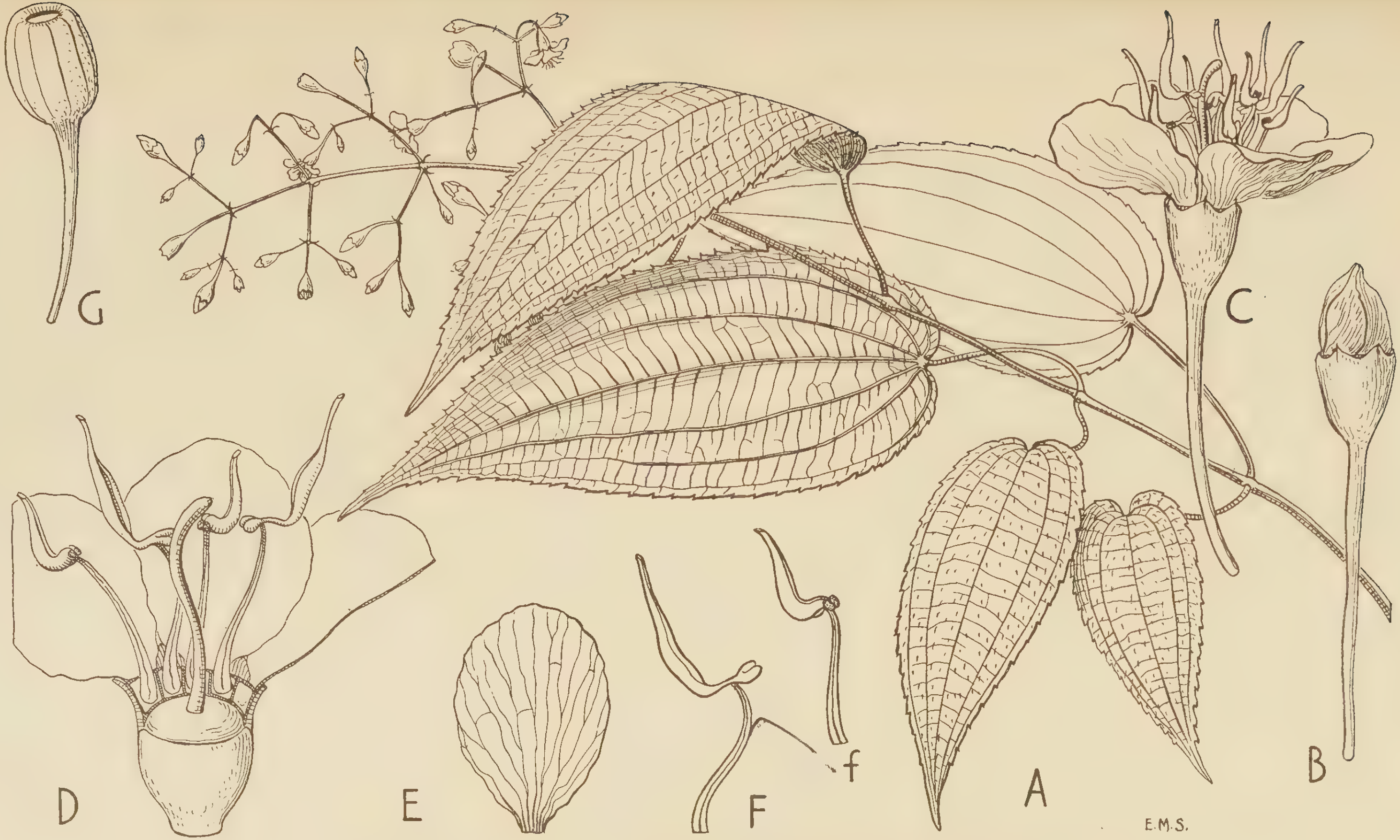

Fig. 100.—Dinophora spenneroides *Benth.* (Melastomataceae).

A, habit, × ½. B, flower bud, × 3. C, flower, × 3. D, dissected flower, × 4. E, petal, × 4. F. & f, stamens, × 4. G, fruit, × 2. A–f are drawn from *Deighton* 5231 ; G from *Linder* 1138.

Calyx with 5 accessory long-setose linear lobes between the sepals, but without accessory lobes behind (i.e. outside) the sepals ; stems creeping, rooting at the nodes ; lamina elliptic to lanceolate, cuneate at base, acuminate at apex, about 8·5 cm. long and 3 cm. broad ; petiole 1·5–1·8 cm. long, closely pubescent and sparingly long-ciliate ; inflorescence terminal, 2–4-flowered, pedicels very short ; petals 2·2–2·4 cm. long .. .. 1. *sylvestris*

Calyx with 10 accessory long-setose linear lobes, one behind (i.e. outside) each sepal as well as between the sepals :

Petiole broad, flattened, densely covered with long setose cilia ; stems subwoody ascending, up to 50 cm. high ; lamina lanceolate or elliptic-lanceolate, acute at each end, 6–10 cm. long, 1·5–4 cm. broad ; inflorescence terminal, distinctly branched, up to 7-flowered, pedicels about 2 mm. long 2. *antennina*

Petiole only slightly flattened, sparsely pilose ; stems very slender, creeping, rooting at the nodes ; lamina ovate-lanceolate, acute at each end, 3–7 cm. long, 1·5–3·5 cm. broad ; inflorescence terminal, 3–8-flowered 3. *humilis*

Leaves glabrous except for the ciliate margin, subsessile, lanceolate, up to 7 cm. long and 3 cm. broad, 5-nerved, paler beneath ; stems glabrous, flowers in paniculate cymes ; calyx with very fine bristle-like accessory lobes ; petals about 3 cm. long .. .. 4. *pobeguinii*

‡Calyx without accessory lobes ; leaves sessile or subsessile :

Calyx-lobes 1·5–2 cm. long ; leaves oblong-lanceolate, or linear-oblong, broad at base, obtuse or subacute, 3–8 cm. long, 0·6–1·3 cm. broad, glabrous except for the sparingly ciliate margin, midrib conspicuous beneath, two lateral nerves obscure ; flowers solitary, pedicels 1 cm. long ; fruit about 2 cm. long, crowned by the persistent calyx-lobes .. .. 5. *cinerascens*

Calyx-lobes less than 1 cm. long ; leaves lanceolate, shortly narrowed at base, up to 3 cm. long, about 0·8 cm. broad, sparingly setose-ciliate on margin and midrib beneath ; very obscurely nerved but with conspicuous midrib ; flowers solitary or 2–3 in terminal cymes, pedicels 2–3 mm. long ; fruit about 1 cm. long, with persistent calyx-lobes .. .. 6. *glauca*

†Calyx-tube pubescent or bristly outside :

Flowers solitary, or up to 3 together :

Leaves glabrous on both surfaces except for sparse appressed setose-hairs on the midrib beneath and petiole, broadly ovate, cuneate at base, triangular acute at apex, 2–3 cm. long, 1·5–2·5 cm. broad, 3–5-nerved, rather long-petiolate ; stems sparingly setose, decumbent, rooting at the nodes ; calyx-tube rather sparsely pubescent with simple bristles .. .. 7. *decumbens*

Leaves setose on both surfaces :

Petals not exceeding 2·5 cm. long :

Stems very slender, decumbent or ascending, 2–10 cm. tall ; hairs on stem, leaves and calyx very long (3–5 mm.) ; leaves ovate-lanceolate, 0·8–3·5 cm. long, 0·5–2 cm. broad ; calyx-tube up to 5 mm. long, densely covered with long simple hairs ; seeds smooth .. .. 8. *pygmaea*

Stems stouter and generally taller than above, hairs not exceeding 3 mm. long ; calyx-tube 5 mm. or more long, usually with plumose hairs ; seeds ridged or papillose :

Herb with decumbent pilose stems rooting at the nodes ; leaves varying from ovate-suborbicular to ovate-lanceolate, 1·5–6 cm. long, 1–2·5 cm. broad, petioles with long spreading hairs or with short hairs ; calyx-tube more or less densely covered with simple and/or plumose bristles ; larger stamens with connectives 4–7 mm. long and anthers 5·5–10 mm. long ; seeds with concentric ridges, pitted in centre .. .. 9. *rotundifolia*

Shrub, to 1·5 m. high, much-branched with erect woody stems, leaves lanceolate to elliptic-lanceolate, 1·5–6·3 cm. long, 0·5–1·8 cm. broad, densely setose-pubescent on both surfaces, petiole up to 2 cm. long, shortly pubescent ; calyx-tube sparingly covered with plumose bristles ; larger stamens with connectives 1·5–2 mm. long and anthers 4–4·5 mm. long ; seeds minutely papillose .. .. 10. *fruticosa*

Petals 4 cm. long ; calyx-tube 5–6 mm. long, silky-tomentose with simple hairs, lobes 12–18 mm. long ; stems woody and sarmentose, tomentose ; leaves ovate-lanceolate to oblong, 3–8 cm. long, 1·5–3·5 cm. broad, densely pilose 11. *jacquesii*

Flowers more or less paniculate :

Leaves with stellate hairs, more or less closely tomentose beneath :

Calyx-tube warty, covered with short stellate hairs ; calyx-lobes early caducous ; flowers produced before the leaves ; lamina elliptic, acute at apex, rounded at base, about 5 cm. long and 3 cm. broad, prominently 5-nerved, petiole about 1 cm. long, densely tomentose .. .. 12. *leonensis*

Calyx-tube not warty, lobes persistent ; petiole up to 2 mm. long, or leaves sessile ; flowers produced on leafy shoots :

Leaves linear, 2–4 cm. long, 2–3 mm. broad, with the two lateral nerves very close to the margin, densely woolly-tomentose beneath ; internodes usually less than 2 cm. .. .. 13. *linearis*

Leaves not linear, much exceeding 3 mm. broad, 5–9-nerved :

Indumentum of calyx-tube predominantly of stellate hairs ; leaves sessile, amplexicaul, 7–9-nerved :

Stem shortly stellate-tomentose ; leaves ovate to ovate-lanceolate, 2–6 cm. long, up to 1·5 cm. broad ; calyx-tube very shortly and sparingly stellate pubescent .. .. 14. *amplexicaulis*

Stem thickly pubescent with long spreading plumose or simple hairs as well as the shorter felt of stellate hairs ; leaves broadly ovate and markedly amplexicaul, up to 5 cm. long and 4 cm. broad ; calyx-tube densely stellate-tomentose 15. *sessilis*

Indumentum of calyx-tube predominantly of simple hairs ; leaves very shortly petiolate, not amplexicaul, 5–7-nerved :

Calyx-tube sparingly pubescent with short simple hairs ; stem stellate-tomentose ; leaves narrowly ovate to lanceolate, up to 7 cm. long and 1·5 cm. broad 16. *canescens*

Calyx-tube densely hairy with long simple setose-hairs and short stellate hairs ; stem with long spreading simple or plumose hairs, sometimes glandular, and with scattered short stellate hairs ; leaves ovate or elliptic, up to 3·5 cm. long and 1·4 cm. broad .. .. 17. *bambutorum*

Leaves with simple hairs or bristles :

øCalyx-lobes setose, often densely so, on the outer surface as well as on the margins and tips :

Calyx-lobes lanceolate to oblong, not subulate :

Tips of calyx-lobes and body of calyx-tube adorned with star-like clumps of large radiating bristles ; lobes about 1 cm. long, obliquely oblong, tube about 1·3 cm. long, densely long-setose ; leaves ovate, deeply cordate, 7–9-nerved with prominent venation, 4–11 cm. long, 2–6 cm. broad, densely hairy on both sides, strigose above, softer beneath .. .. 18. *graminicola*

Tips of calyx-lobes without star-like clumps of large bristles :

Calyx-tube covered with round stalked processes covered with white hairs ; calyx-tube 1·5–1·8 cm. long ; petals about 4 cm. long ; stems 4-angled with winged corners ; petioles 1·5–4 cm. long, lamina oblong-ovate, rounded to cordate at base, 5–7-nerved, 7–15 cm. long, 3·5–6 cm. broad, glabrous except for closely appressed hairs on the nerves beneath and on the upper surface 19. *splendens*

Calyx-tube with simple or forked hairs, or with flat, bristle-tipped, scale-like projections :

Stems more or less densely covered with simple hairs, leaves 5–7-nerved:

Leaves much less than 15 cm. long ; ovate to ovate-lanceolate :

Stems and petioles with long shaggy hairs ; bracts glabrous except for the ciliate margins ; leaves ovate to ovate-lanceolate, rounded at base, gradually acute at apex, 4–9 cm. long, 1–4 cm. broad, lamina on both surfaces long-pilose, 5-nerved ; calyx-tube setose with long and short simple hairs .. .. 20. *bamendae*

Stems with shorter appressed hairs ; bracts pubescent all over :

Calyx-tube about 1 cm. long and broad, with numerous imbricate bristle-tipped scales, densely bristly ; calyx-lobes obliquely oblong-lanceolate, about 1 cm. long, densely pubescent ; petals about 3 cm. long ; bracts broad, rounded ; leaves ovate to ovate-lanceolate, 5–8 cm. long, 1·5–4 cm. broad, obtuse or rounded at base .. .. .. 21. *perkinsiae*

Calyx-tube 6–8 mm. long and 4–5 mm. broad, with bristle-tipped scales only at apex and caducous with the lobes, shortly setose with simple hairs beneath ; calyx-lobes narrowly lanceolate up to 3 mm. long ; petals up to 1 cm. long ; bracts acute ; stems sharply 4-angled ; leaves ovate, cordate at base, 7–9-nerved, up to 12 cm. long and 7 cm. broad, petiole about 5 mm. long .. .. 22. *brazzae*

Leaves 15–30 cm. long, 3·5–6 cm. broad, lanceolate, rounded at base, densely hirsute beneath, petiole 2–5 cm. long ; stems very densely pilose, with long internodes 15–20 cm. ; calyx-tube densely covered with long simple and shorter branched hairs and lanceolate scales .. .. 23. *pulcherrima*

Stems glabrous or scabrid with short bristly scales ; leaves lanceolate, 3–5-nerved, up to 20 cm. long and 6 cm. broad, petiole up to 6 cm. long ; calyx-tube and lobes densely setose :

Stem glabrous between the nodes, with denticulate scales in the inflorescence region only ; leaves with closely appressed setae fused to both surfaces 24. *elliotii* var. *elliotii*

Stem scabrid with numerous denticulate scales throughout its length ; leaves densely long-setose with the setae fused to the surface for only a part of their length .. .. 24a. *elliotii* var. *setosior*

Calyx-lobes subulate, long-bristly, caducous ; calyx-tube 6–8 mm. long, 4–5 mm. broad, covered with simple bristles and bristle-tipped scales ; petals up to 1 cm. long ; leaves elliptic, cuneate to obtuse at base, usually 5-nerved, 4·5–10 cm. long, 1·5–5·5 cm. broad, petiole 1–3 cm. long .. 25. *multiflora*

øCalyx-lobes glabrous outside, except for the ciliate margins and crest of long bristles at the tip ; rarely with a few hairs on the midrib :

Erect shrub to 3 m. high ; stems appressed setulose, long-setose at nodes ; leaves ovate-elliptic to oblong 5–9·5 cm. long, 2·5–5 cm. broad, softly pilose on both surfaces, petiole 1–1·5 cm. ; calyx-tube 8–9 mm. long with long bristle-tipped scales, otherwise glabrous ; calyx-lobes lanceolate, 1·5 cm. long, with bristles at tip, margins very sparsely ciliolate ; petals 2·5–3 cm. long 26. *idanreensis*

Herbs ; stems with spreading hairs ; leaves subsessile, or petiole up to 6 mm. long ; calyx-lobes strongly ciliate :

Calyx-tube at least 12 mm. in diam., densely covered with long bristles which completely hide the surface of the tube ; calyx-lobes oblong about 1 cm. long, strongly ciliate with long bristles and with a large crest of bristles at the tip ; petals about 3 cm. long ; inflorescences rather few-flowered ; stems and leaves with numerous long stiff bristles ; leaves broadly lanceolate, subsessile, or with petiole up to 4 mm. long, 3–5-nerved .. 27. ? *longisetosa*

Calyx-tube less than 7 mm. in diam., with the surface clearly visible between the scales and bristles :

Petals 2–4 cm. long ; calyx-tube 8–10 mm. long ; leaves lanceolate, 4–13 cm. long, 1–3 cm. broad, petiole up to 6 mm. long :

Stems densely setose between the nodes .. 28. *grandiflora* var. *grandiflora*

Stems sparingly setulose between the nodes, with long bristles at the nodes 28a. *grandiflora* var. *lambii*

Petals 1–1·5 cm. long ; calyx-tube up to 6 mm. long ; flowers very numerous ; stems densely covered with long spreading rather slender hairs ; leaves linear to lanceolate, 4–10 cm. long, 0·5–2 cm. broad, pilose with long slender hairs .. .. 29. *irvingiana*

*Flowers several in a head usually surrounded by large persistent membranous bracts, or solitary and surrounded by large persistent bracts :

Petals 4 ; bracts inconspicuous ; calyx-tube short and becoming subglobose in fruit ; leaves subsessile, lanceolate, subacute, 4–6 cm. long, 1–2 cm. broad, 3-nerved, pilose ; flowers small in dense heads, surrounded by the uppermost leaves ; calyx-tube glabrescent in the lower part ; lobes lanceolate, 3 mm. long, alternating with bristle-tipped appendages .. .. 30. *phaeotricha*

Petals 5 ; bracts large and conspicuous, becoming dry in fruit :

Calyx-tube with bristly hairs around the middle or all over the surface :

Leaves broadly lanceolate, acute, rounded at base, shortly petiolate, 4–6 cm. long, 2 cm. broad, 5-nerved, slightly appressed-setulose ; bracts 2 cm. long ; no glandular hairs .. .. 31. *cornifolia*

Leaves broadly ovate, acutely acuminate, sometimes cordate at base, rather long-petiolate, 5–8 cm. long, 3–5 cm. broad, 5-nerved, long-pilose ; bracts pilose and ciliate ; stems densely shaggy with usually gland-tipped hairs 32. *paucistellata*

Calyx-tube glabrous except at base :

Flowers single, each surrounded by an involucre of bracts about 1 cm. long ; leaves broadly lanceolate, subacute, rounded at base, 6–10 cm. long, 2–4 cm. broad, 5-nerved, appressed-pilose on both surfaces, distinctly petiolate 33. *segregata*

Flowers several in a head with a common involucre of bracts :

Stem glabrous, or with simple, not glandular, hairs :

Leaves lanceolate or linear-lanceolate, subsessile, or with petiole not exceeding 5 mm. ; bracts membranous in fruit :

Stem glabrous or nearly so, quadrangular, almost white ; petals blue or purple ; bracts becoming membranous and almost hyaline in fruit ; leaves 4–8 cm. long, 1–1·5 cm. broad, 3–5-nerved, sparingly setulose .. .. 34. *theifolia*

Stem hispid with long spreading hairs ; petals white ; leaves 4–5 cm. long, 6–10 mm. broad ; leaves sparsely appressed-pilose above, shortly setulose beneath .. .. 35. *controversa*

Leaves ovate, acute, rounded to cuneate at base, 5–13 cm. long, 3–6·5 cm. broad, 5-nerved, petiole 0·5–2·5 cm. long, strigose or pubescent on both surfaces, stems hirsute or strigose ; bracts not membranous in fruit, calyx-lobes not hairy in the middle .. .. 36. *erecta*

Stems densely covered with soft gland-tipped hairs ; leaves, etc., more or less as in *D. erecta* but calyx-lobes with a line of hairs up the middle 37. *lecomteana*

1. **D. sylvestris** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 10 : 632 (1938). Herb with long creeping stems rooting at the nodes, with erect branches ; in moist shady places ; petals pink.
Fr.G.: Ziama Forest, Macenta (Oct.) *Jac.-Fel.* 2088 !

2. **D. antennina** (*Sm.*) *Triana* in Trans. Linn. Soc. 28 : 58 (1871) ; F.T.A. 2 : 451 ; Gilg in Engl. Monogr. Afr. Melastom. 15 ; Jac.-Fel. l.c. 635. *Osbeckia antennina* Sm. (1813). *Lignieria alpestris* A. Chev. Bot. 279. Herb with ascending stems, to 18 in. high ; perennating with tubers in the dry season.
Fr.G.: Kinsan, 2,500 ft. *Jac.-Fel.* 2087. Bilima Mt. *Jac.-Fel.* 1831. Ziama Mt., 2,500 ft., Macenta (Oct.) *Jac.-Fel.* 2089 ! Dalaba (Oct.) *Chev.* 18781 ! **S.L.:** *Don* ! Sugar Loaf Mt., 1,000 ft. (Nov.) *Deighton* 5623 !

3. **D. humilis** *A. Chev. & Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 684 (1932) ; Jac.-Fel. op. cit. 10 : 635 (1938). Creeping herb ; similar to above.
Fr.G.: Gangan Mt., Kindia (Nov.) *Jac.-Fel.* 220. Diaguissa (Oct.) *Jac.-Fel.* 2054 !

4. **D. pobeguinii** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 211 (1927) ; Kew Bull. 1928 : 221. Erect unbranched herb, to 2 ft. high, with pale stem and large red-purple flowers.
Fr.G.: Baffing R., Douné (Aug.) *Pobéguin* 1695 ! Bilima *Jac.-Fel.* 2145 !

5. **D. cinerascens** *Hutch.* in Kew Bull. 1921 : 372. Erect glaucous herb, to 18 in. high, stems somewhat fleshy ; petals magenta.
N.Nig.: Birnin Gwari (June) *Keay* FHI 25878 ! Bauchi Plateau : Naraguta (June) *Lely* 259 ! P. 331 ! Vom *Dent Young* 94 ! Also in French Cameroons and French Congo.

6. **D. glauca** *Keay* in Kew Bull. 1952 : 545 (1953). *D. rupicola* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 211 (1927) ; Kew Bull. 1928 : 221 ; not of Gilg ex Engl. (1921). Stem prostrate, rooting at the nodes ; in dry places amongst rocks.
S.L.: *Hart* ! Sugar Loaf Mt., (Dec.) *Sc. Elliot* 3977 ! **Lib.:** Zwedru, Tchien (Aug.) *Baldwin* 7065 ! Tawata, Boporo (Nov.) *Baldwin* 10351 !

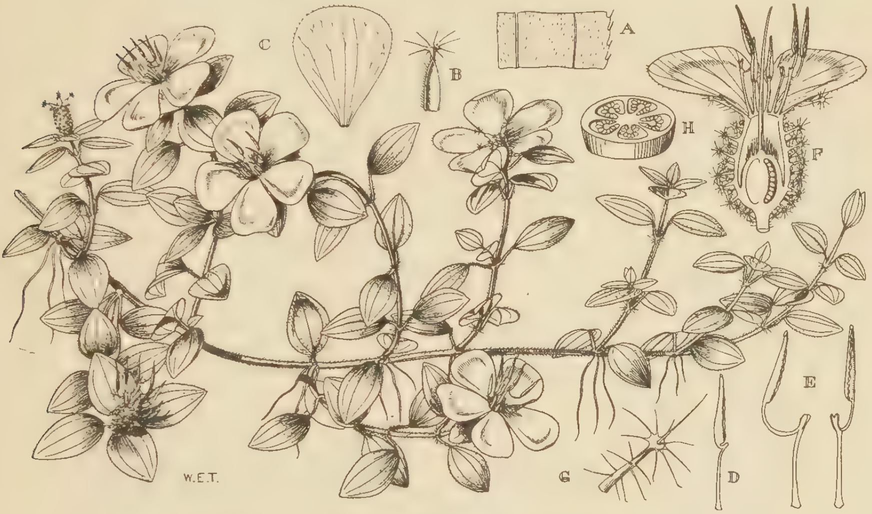

FIG. 101.—DISSOTIS ROTUNDIFOLIA (*Sm.*) *Triana* (MELASTOMATACEAE).

A, under-surface of leaf. B, calyx-lobe tipped with stellate bristle. C, petal. D, E, stamens. F, vertical section of flower. G, stalked stellate bristle from calyx-tube. H, cross-section of ovary.

7. **D. decumbens** (*P. Beauv.*) *Triana* l.c. 58 (1871) ; Gilg l.c. 15. *Melastoma decumbens* P. Beauv. (1806). *D. laevis* (Benth.) Hook. f.—F.T.A. 2 : 451. Stems creeping with erect branches ; flowers rose, ½–¾ in. diam.
S.Nig.: Nun R. (Aug.) *T. Vogel* 36 ! Degema *Talbot* ! **F.Po:** (Dec.) *Guinea* 258 ! Also in French Cameroons, Gabon, Congo and Angola.

8. **D. pygmaea** *A. Chev. & Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 685 (1932). A delicate herb, sometimes growing in clumps ; on moist shaded rocks.
Fr.G.: Mt. Gangan, Kindia, (Nov.) *Jac.-Fel.* 195. Benna massif (Nov.) *Jac.-Fel.* 2108 !
[This is possibly the same as *D. rupicola* Gilg ex Engl. Pflanzenw. Afr. 3, 2 : 748 (1921), described from Sinoe Basin, Liberia.]

9. **D. rotundifolia** (*Sm.*) *Triana* l.c. 58 (1871) ; Gilg l.c. 15. *Osbeckia rotundifolia* Sm. (1813). *D. plumosa* (D. Don) Hook. f. and *D. prostrata* (Thonn.) Hook. f.—F.T.A. 2 : 452 ; Chev. Bot. 274. *D. deistelii* Gilg ex Engl. Pflanzenw. Afr. 3, 2 : 748 (1921). A common and variable decumbent herb, often in damp places ; flowers pink or mauve, about 2 in. diam.
Fr.G.: Mamou (Jan.) *Chev.* 20386. Beyla (Mar.) *Chev.* 20870. Macenta *Jac.-Fel.* 839. **S.L.:** *Afzelius* ! *T. Vogel* 152 ! 154 ! Lester Peak (Dec.) *Sc. Elliot* 3874 ! Njala (Sept.) *Deighton* 2101 ! Musaia (Apr.) *Deighton* 5389 ! **Lib.:** Kakatown *Whyte* ! Dukwia R. (Oct., Nov.) *Cooper* 23 ! **Iv.C.:** Mankono (June) *Chev.* 21932 ! **G.C.:** Aburi (Oct.) *Johnson* 461 ! Bonpata (Dec.) *Dalz.* 137 ! Essiama, W.P. (Apr.) *Williams* 438 ! **Togo:** Misahöhe (Nov.) *Mildbr.* 7390 ! **N.Nig.:** Patti Lokoja (Sept.) *T. Vogel* 184 ! Bauchi Plateau (May) *Lely* P. 289 ! **S.Nig.:** Abeokuta *Irving* 55 ! Lagos (Oct.) *Dalz.* 1187 ! **Br.Cam.:** Buea (Nov.) *Migeod* 7 ! **F.Po:** Musola (Jan.) *Guinea* 1259 ! Widespread in tropical Africa. (See Appendix, p. 71.)

10. **D. fruticosa** (*Brenan*) *Brenan & Keay* in Kew Bull. 1952 : 547 (1953). *D. rotundifolia* var. *fruticosa* Brenan in Kew Bull. 1950 : 227. Erect shrub of spreading habit, to 5 ft. high, on rocky hills ; young stems, petioles and nerves pink ; petals pale pink, opening in the morning and soon falling.
S.Nig.: Ondo (Sept.) *Keay* FHI 22569 ! Idanre Hills (Oct.) *Keay* FHI 25503 ! 25512 !

11. **D. jacquesii** *A. Chev.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 686 (1932) ; Jac-Fel. in Bull. Soc. Bot. Fr. 82 : 284, with fig. (1935). Plant with woody sarmentose branches, growing in clumps and reaching several metres ; petals violet.
Fr.G.: Mt. Gangan, Kindia *Jac.-Fel.* 240. Ditinn *Jac.-Fel.* 586. Pita *Jac.-Fel.* 679 ! Benna *Jac.-Fel.* 2097. **S.L.:** Picket Hill (Sept.) *T. S. Jones* 196 ! **Iv.C.:** Tonkoui *Jac.-Fel.* 1270.

12. **D. leonensis** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 211 (1927) ; Kew Bull. 1928 : 222. Shrub, to 6 ft. high; flowers purple, produced before the leaves.
Fr.G.: Pita *Jac.-Fel.* 743. Kindia *Jac.-Fel.* 2142. Fouta Djalon *Pobéguin* 2281. **S.L.:** Kessewe Hill (Apr.) *Lane-Poole* 126 ! Sankon Biriwa (Feb.) *Deighton* 3507 ! Loma Mts. (Nov.) *Jaeger* 661 !

13. **D. linearis** *Jac.-Fel.* in Bull. I.F.A.N. 15 : 980, fig. 2 (1953). *D. incana* of Chev. Bot. 273 and of F.W.T.A., ed. 1, 1 : 212, partly (*Chev.* 13322), not of (E. Mey. ex Hochst.) Triana. Erect herb in marshy soil.
Fr.G.: Dinguiraye (Dec.) *Jac.-Fel.* 1467 ! Timbo (Apr.) *Chev.* 13322 ; 13599. Labé to Mali *Chev.* 34391. Bouria to Ditinn *Pobéguin* 1416.

14. **D. amplexicaulis** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 8 : 108 (1936). *D. gilgiana* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 212 (1927) ; Kew Bull. 1928 : 222 ; not of De Wild. *D. incana* var. *gilgiana* A. Chev. Bot. 274. Plant 2–3 ft. high ; flowers a fine red ; in moist ground.
Fr.Sud.: Sicoro (Jan.) *Chev.* 228 ! **Fr.G.:** Toukan to Bouria (Apr.) *Chev.* 12924 ! Douné (Dec.) *Chev.* 14634 ! **S.L.:** Erimakuna *Sc. Elliot* 5218 ! **Iv.C.:** Mankono circle (July) *Chev.* 21997 !

15. **D. sessilis** *Hutch. ex Brenan & Keay* in Kew Bull. 1952 : 545 (1953). Shrubby perennial herb, 2–4 ft. high ; flowers cerise.
S.L.: Bintumane Peak, 5,000–6,000 ft. (Nov., Jan.) *Glanville* 386 ! 464 ! *T. S. Jones* 80 ! 93 ! *Nichols* 9 ! Loma Mts. (Nov.) *Jaeger* 491 !

16. **D. canescens** (*Graham*) *Hook. f.* in F.T.A. 2 : 453 (1871). *Osbeckia canescens* Graham (1840). *Osbeckia incana* E. Mey. ex Hochst. (1845–6). *D. incana* (E. Mey. ex Hochst.) Triana ; Gilg l.c. 17 ; F.W.T.A., ed. 1, 1 : 212, partly. Erect herb 3–4 ft. high in wet places ; flowers pink or purple.
N.Nig.: Kontagora (Dec.) *Dalz.* 82 ! Bauchi Plateau : Naraguta (Nov.) *Lely* 720 ! Vom *Dent Young* 97 ! Ropp (Dec.) *Savory* UCI 121 ! [These specimens have the calyx-tube sparsely covered with simple instead of stellate hairs as in other forms of the species which is widespread in tropical and southern Africa ; our form has been described as var. *sudanensis* Jac.-Fel. in Bull. I.F.A.N. 15 : 980 (1953).]

17. **D. bambutorum** *Gilg & Ledermann ex Engl.* Pflanzenw. Afr. 3, 2 : 750 (1921). Erect herb, to 3 ft. high, at edge of forest and by streams ; flowers bright pink.
Br.Cam.: Lakom, Bamenda, 6,000 ft. (Apr.) *Maitland* 1679 ! Near L. Bambulue, 6,200 ft. (Jan.) *Keay* FHI 28370 ! Near Bamenda, 6,000–7,500 ft. (Jan.) *Migeod* 382 ! 422 ! Also in French Cameroons.

18. **D. graminicola** *Hutch.* in Kew Bull. 1921 : 371. Erect shrubby herb, to 6 ft. high ; flowers about 2½ in. diam., bluish purple or magenta.
N.Nig.: between Abuja and Kagarko (Dec.) *Meikle* 1588 ! Dogon Kurmi, Jemaa (Nov.) *Keay* FHI 21734 ! Naraguta (Aug., Jan.) *Lely* 543 ! P. 126 ! Jos (Nov.) *Keay* FHI 21027 !

19. **D. splendens** *A. Chev. & Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 4 : 686 (1932). Perennial, to 6 ft. high with 4-winged stems and large mauve flowers.
Fr.G.: Gangan Mt., Kindia *Jac.-Fel.* 207. Pita *Jac.-Fel.* 1960. Dalaba *Jac.-Fel.* 2053. Benna *Jac.-Fel.* 2098.

20. **D. bamendae** *Brenan & Keay* in Kew Bull. 1952 : 546 (1953). Stout herb to 6 ft. high ; flowers about 2 in. diam., deep pink or violet.
Br.Cam.: Bamenda, 5,400–7,000 ft. (Jan.) *Migeod* 392 ! *Keay* FHI 28344 ! Nchan, Bamenda, 5,000 ft. (June) *Maitland* 1734 ! Also in French Cameroons.

21. **D. perkinsiae** *Gilg* in Engl. Monogr. Afr. Melastom. 21 (1898). Shrub, 3–5 ft. high ; flowers about 2½ in. diam., reddish-violet or deep mauve-purple.
Togo: Bismarckburg (Feb.) *Büttner* 385 ! Misahöhe (Nov.) *Mildbr.* 7254 ! **S.Nig.:** Unya, Obudu (Dec.) *Keay & Savory* FHI 25020 ! **Br.Cam.:** Tinta, Mamfe (Jan.) *Jeme* FHI 2033 ! Bamenda, 5,000 ft. (Apr.) *Maitland* 1429 ! Also in French Cameroons.

22. **D. brazzae** *Cogn.* in DC. Monogr. 7 : 372 (1891) ; Exell in J. Bot. 67, Suppl. 1 : 179 (1929). *D. multiflora* of Gilg l.c. 18, partly ; of F.W.T.A., ed. 1, 1 : 212, partly ; not of Triana. Shrubby herb, to 8 ft. high; flowers mauve or purple.
Fr.G.: Macenta (Oct.) *Jac.-Fel.* 1090 ! *Baldwin* 9834 ! Nzérékoré (Oct.) *Baldwin* 9701 ! Mt. Nimba (Sept.) *Schnell* 3589 ! **S.L.:** Benikoro (Oct.) *Thomas* 2889 ! **Togo:** Misahöhe (Nov.) *Mildbr.* 7201 ! **Br.Cam.:** Bamenda, 7,000 ft. (Oct.) *Johnstone* 242/31 ! Also in Congo, Uganda and Angola.

23. **D. pulcherrima** *Gilg* l.c. 20 (1898). " A 9–12-ft. high, stiff, erect, unbranched shrub which only after flowering produces adventitious shoots ; flowers lilac, about 1½ in. diam."
Togo: Misahöhe *Baumann* 387. Bismarckburg (Jan., Feb.) *Büttner* 369.

24. **D. elliotii** *Gilg* var. **elliotii**—Gilg l.c. 19 (1898). *D. thollonii* A. Chev. Bot. 275, not of Cogn. *D. floribunda* A. Chev. Bot. 273. Stout herb or undershrub to 8 ft. high ; flowers red- or blue-purple, about 1½ in. diam.
Fr.Sud.: Koundian (Feb.) *Chev.* 417 ! **Fr.G.:** near Mamou (Mar.) *Dalz.* 8378 ! **S.L.:** Kukuna (Jan.) *Sc. Elliot* 4513 ! Likuru (Feb.) *Sc. Elliot* 4996 ! Kamalo (Feb.) *Deighton* 3497 ! Bintumane Peak, 4,500–5,400 ft. (Jan.) *T. S. Jones* 89 ! 96 ! **Lib.:** Mao R. (Feb.) *Bequaert* 54 ! **N.Nig.:** Vom *Dent Young* 99 ! **Br.Cam.:** Lakom, Bamenda (Apr.) *Maitland* 1677 ! Near Batibo (Jan.) *Keay* FHI 28329 ! Bamenda (May) *Maitland* 1444 !

24a. **D. elliotii** var. **setosior** *Keay & Brenan* in Kew Bull. 1950 : 342 (1951). Similar to above, but with scabrid stem and more densely setose leaves.
S.Nig.: Balleghete, Obudu (Jan.) *Rosevear* 4/30 ! Koloishe, 5,000–5,400 ft. (Dec.) *Keay & Savory* FHI 25080 ! Ikwette (Dec.) *Keay & Savory* FHI 25236 !

25. **D. multiflora** (*Sm.*) *Triana* l.c. 58 (1871) ; Gilg l.c. 18 (excl. syn. *D. brazzae* Cogn.) ; Chev. Bot. 274. *Osbeckia multiflora* Sm. (1813)—F.T.A. 2 : 442. *Osbeckia liberica* Stapf in J. Linn. Soc. 37 : 98 (1905) ; F.W.T.A., ed. 1, 1 : 208. Shrubby herb, to 4 ft. high, usually in moist places ; flowers pink, about 1 in. diam.
Fr.G.: Nzérékoré (June) *Jac.-Fel.* 954 ! 1103 ! **S.L.:** *Don* ! Sherbro *Sc. Elliot* 5788 ! Kenema (Jan.) *Thomas* 7684 ! Njala (Sept.) *Deighton* 2122 ! Peri, Gaura (Oct.) *Deighton* 5209 ! **Lib.:** Monrovia *Whyte* ! Sinoe Basin *Whyte* ! Du R. (July) *Linder* 118 ! **Iv.C.:** *fide* Chev. *l.c.* **S.Nig.:** Onitsha *Barter* 1796 ! Eket *Talbot* 3358 ! Oban *Talbot* ! **Br.Cam.:** Rio del Rey *Johnston* ! Also in French Cameroons and Congo. (See Appendix, p. 71.)

26. **D. idanreensis** *Brenan* in Kew Bull. 1950 : 214. Erect shrub to 10 ft. high, on rocky hills where it flowers when leafless, and in swampy grassland ; petals magenta.
S.Nig.: R. Oshun, Ibadan (Nov.) *Keay* FHI 28139 ! Idanre Hills (Jan.) *Brenan & Keay* 8694 !

27. **D. ? longisetosa** *Gilg & Ledermann ex Engl.* Pflanzenw. Afr. 3, 2 : 752 (1921). Erect, sparingly branched herb with rough brown bristles ; flowers purple-pink.
S.Nig.: Koloishe Mt., Obudu, 5,000–5,400 ft. (fl. & fr. Dec.) *Keay & Savory* FHI 25084 ! **Br.Cam.:** L. Bambulue, Bamenda, 7,000 ft. (Oct.) *Johnston* 220/31 ! Also in French Cameroons.
[These specimens agree perfectly with specimens from the type locality—the Bambuto Mts.—but differ from Engler's description in having asymmetrical calyx lobes.]

28. **D. grandiflora** (*Sm.*) *Benth.* var. **grandiflora**—F.T.A. 2 : 455 ; Gilg l.c. 21 ; Chev. Bot. 273. *Osbeckia grandiflora* Sm. (1813). *D. djalonis* A. Chev. Bot. 273. Stem 1–2 ft. from a woody tuberous base ; flowers purple, 2 in. or more in diam.
Fr.G.: (Sept.) *Farmar* 261 ! Fouta Djalon *Heudelot* 779 ! Mali *Jac.-Fel.* 1979. Dalaba *Jac.-Fel.* 2051. **S.L.:** *Don !* *Sc.Elliot* 4490 ! Hastings *Dawe* ! Mange Bureh (Jan.) *Deighton* 1046 ! Musaia (Apr.) *Deighton* 5416 ! **Lib.:** Pandamai (Mar.) *Bequaert* 96 ! **Iv.C.:** *fide* Chev. *l.c.* (See Appendix, p. 71.)

28a. **D. grandiflora** var. **lambii** (*Hutch.*) *Keay* in Kew Bull. 1952 : 545 (1953). *D. lambii* Hutch. in Kew Bull. 1916 : 230; F.W.T.A., ed. 1, 1 : 212. Stem 4-5 ft., simple or sparingly branched ; flowers mauve or blue-purple, about 3 in. diam.

Fr.G.: (July) *Collenette* 77 ! **G.C.:** Wanki, Ashanti (June) *Chipp* 483 ! **N.Nig.:** Kaduna (Oct.) *Lamb* 58 ! Naraguta (June) *Lely* 285 ! 484 ! P. 578 !

29. **D. irvingiana** *Hook.*, Bot. Mag. t. 5149 (1859) ; F.T.A. 2 : 453 ; Gilg l.c. 20 ; Chev. Bot. 274. *Osbeckia calotricha* of Chev. Bot. 274, partly, not of Gilg. Stems erect, branched, 4-angled, 3–4 or more ft. high ; flowers rose-purple. Flourishing in moist places, but abundant also in dry bush.

Gam.: *Brown-Lester* 21 ! **Port G.:** Pussubé (Mar.) *Esp. Santo* 1143 ! **Fr.Sud.:** Sicoro (Jan.) *Chev.* 230. **Fr.G.:** Timbo *Pobéguin* 1697 ! Kankan *Jac.-Fel.* 496. Macenta *Jac.-Fel.* 1308. **S.L.:** Musaia (Dec.) *Deighton* 5710 ! Warantamba (Oct.) *Small* 370 ! **Iv.C.:** Orodougou (June) *Chev.* 21830 ! **G.C.:** Krobo (Dec.) *Johnson* 496 ! Kintampo (June) *Vigne* 3048 ! **Togo:** Kpedsu (Dec.) *Howes* 1054 ! Misahöhe (Nov.) *Mildbr.* 7335 ! Lome *Warnecke* 437 ! **N.Nig.:** Nupe *Barter* 1025 ! Naraguta (June, Aug.) *Lely* 333 ! P. 570 ! Abinsi (Dec.) *Dalz.* 717 ! **S.Nig.:** Abeokuta *Irving* 119 ! Olokemeji *Foster* 302 ! **Br.Cam.:** Bamenda to Kentu (June) *Maitland* 1551 ! Also in French Cameroons and Ubangi-Shari-Chad. (See Appendix, p. 71.)

30. **D. phaeotricha** (*Hochst.*) *Triana* in Trans. Linn. Soc. 28 : 58 (1871) ; F.T.A. 2 : 451 ; Gilg l.c. 14. *Osbeckia phaeotricha* Hochst. (1844). *D. villosa* Hook. f. in F.T.A. 2 : 450 (1871). *Osbeckia postpluvialis* Gilg. Herb 6–18 in. high ; petals 4, mauve or purple ; in moist places and cultivated fields.

Gam.: *Dawe* 31 ! **Fr.G.:** Youkounkoun *Jac.-Fel.* 702. Gaoual *Jac.-Fel.* 712. Dinguiraye *Jac.-Fel.* 1456. **N.Nig.:** Nupe *Barter* 895 ! 1315 ! Kontagora (Nov.) *Dalz.* 84 ! Anara F.R. (Oct., Nov.) *Keay* FHI 5448 ! 28119 ! Vom *Dent Young* 100 ! Ropp (July) *Lely* 447 ! Abinsi (Apr.) *Dalz.* 755 ! Widespread in tropical Africa and in S. Africa.

31. **D. cornifolia** (*Benth.*) *Hook. f.* in F.T.A. 2 : 448 (1871) ; Gilg l.c. 13. *Heterotis cornifolia* Benth. (1849). Herb, to 3 ft. high, in moist places ; petals mauve to purple.

S.L.: *Afzelius* ! Ronietta (Nov.) *Thomas* 5326 ! 5444 ! Benikoro (Oct.) *Thomas* 2892 ! Njala (June) *Deighton* 1745 ! Rhombe (Mar.) *Adames* 152 ! **Lib.:** Grand Bassa (July) *T. Vogel* 80 ! Monrovia (July) *Linder* 30 !

32. **D. paucistellata** *Stapf* in J. Linn. Soc. 37 : 99 (1905). A hirsute herb, 2-3 ft. high ; flowers rose, about 2 in. diam., in involucrate heads. Very similar to and easily mistaken for *Tristemma hirtum* but distinguished by the usually gland-tipped hairs, by the calyx being bristly all over, and the unequal stamens.

Fr.G.: Mamou *Jac.-Fel.* 776. **S.L.:** Kabusa, Limba (Apr.) *Sc. Elliot* 5478 ! Rowala (July) *Thomas* 1042 ! Bumbuna (Oct.) *Thomas* 3764 ! Njala (Oct.) *Deighton* 1418 ! **Lib.:** Monrovia *Whyte* ! Kakatown *Whyte* ! Kolubanu (Oct.) *Linder* 1133 ! Mt. Barclay (Jan.) *Dalz.* 8092 ! **G.C.:** Axim *Joly.* (See Appendix, p. 71.)

[M. Jacques-Félix informs me that Dr. Joly's specimen, cited by Cogniaux l.c. 364 as *D. afzelii* Hook f., is *D. paucistellata* Stapf. If Joly's specimen is in fact identical with *Afzelius* s.n. type of *D. afzelii* (a specimen which has not been seen either by Hutchinson, Jacques-Félix or myself), then *D. paucistellata* Stapf must, as would appear likely from the descriptions, be regarded as a synonym of *D. afzelii* Hook. f. —F.T.A. 2 : 449—R.W.J.K.]

33. **D. segregata** (*Benth.*) *Hook. f.* in F.T.A. 2 : 448 (1871) ; Gilg l.c. 12. *Heterotis segregata* Benth. (1849). Stem 4-angled, with bristles at the nodes, shrubby below ; 2–3 ft. high ; at edges of swamps, etc. ; flowers red- or blue-purple, about 1½ in. diam.

N.Nig.: Nupe *Barter* 1311 ! Lokoja *Ansell* ! **S.Nig.:** Lagos (Apr.) *Dalz.* 1185 ! Nun R. (Aug.) *T. Vogel* 12 ! Ibo country (Aug.) *T. Vogel* 9 ! Calabar (Sept.) *Holland* 131 ! Widespread in tropical Africa, reaching S. Rhodesia and Angola.

34. **D. theifolia** (*G. Don*) *Hook. f.* in F.T.A. 2 : 449 (1871) ; Gilg l.c. 13, t. 2A ; Chev. Bot. 275. Shrubby herb, 2–6 ft. high ; branches 4-angled, white, with bristles at the nodes ; flowers red- to blue-purple, 1–1½ in. diam. Often in dry rocky places.

Fr.G.: Fouta Djalon (Sept.–Oct.) *fide* Chev. *l.c.* **S.L.:** *Don* ! Hills above Freetown (Nov., Dec.) *Sc. Elliot* 3840 ! *Deighton* 232 ! Mamunta (Nov.) *Deighton* 4935 ! **Togo:** Agome Mts. (Oct.) *Baumann* 319 ! **N.Nig.:** Patti Lokoja (Oct., Nov.) *Dalz.* 85 ! *Keay* FHI 28095 ! Panshanu (Sept.) *Lely* 607 ! **S.Nig.:** Lagos (Nov.) *Dalz.* 1186 ! Abeokuta *Irving* 57 ! Onitsha *Barter* 1772 ! Obanliko (Dec.) *Keay & Savory* FHI 25016 ! **Br.Cam.:** Bambui, Bamenda (Apr.) *Maitland* 1627 ! Also in French Cameroons. (See Appendix, p. 72.)

35. **D. controversa** (*A. Chev. & Jac.-Fel.*) *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 7 : 372 (1935). *Tristemma controversa* A. Chev. & Jac.-Fel. in op. cit. 4 : 681 (1932). Erect herb, to 3 ft. high, with tuberous roots ; flowers pure white.

Fr.G.: Gangan Mt., Kindia (Oct.) *Jac.-Fel.* 194 !

36. **D. erecta** (*Guill. & Perr.*) *Dandy*[1] in F. W. Andr. Fl. Pl. A.-E. Sudan 1 : 192 (1950). *Tristemma erectum* Guill. & Perr. Fl. Seneg. 312 (1833). *Heterotis capitata* Benth. (1849). *D. capitata* (Benth.) Hook. f. in F.T.A. 2 : 449 (1871) ; Gilg l.c. 13 ; F.W.T.A., ed. 1, 1 : 213. *D. hirsuta* Hook. f. in F.T.A. 2 : 450 (1871). ? *D. radicans* Hook. f. in F.T.A. 2 : 450 (1871). Shrubby herb to 4 ft. high, in dry situations as well as by streams ; flowers purple, red, pink or rarely white.

Fr.Sud.: Sikasso (May) *Chev.* 791. **Fr.G.:** *Heudelot* 826 ! Macenta (Oct.) *Baldwin* 9819 ! Diaguissa (Apr., Sept.) *Chev.* 13459 ; 13464 ; 18583. **S.L.:** *Don* ! *T. Vogel* 175 ! Kaballa (Sept.) *Thomas* 2185 ! 2200 ! Freetown (Oct.) *Deighton* 2170 ! Kenema (Oct.) *Deighton* 5226 ! **Iv.C.:** *Farmar* 357 ! **G.C.:** Ntonso, Ashanti (Oct.) *Darko* 389 ! **Togo:** Misahöhe (May) *Baumann* 302, and other localities *fide* Gilg *l.c.* **N.Nig.:** Nupe *Barter* 1312 ! Anara F.R. (Oct.) *Keay* FHI 5450 ! Vodni, 4,600 ft. (July) *Lely* 425 ! Bauchi Plateau (July, Oct.) *Lely* P. 380 ! P. 797 ! Abinsi (June) *Dalz.* 762 ! **S.Nig.:** Lagos Colony *MacGregor* 36 ! Sapoba (Mar.) *Jones* FHI 6112 ! Bateriko (June) *Jones* FHI 18985 ! Extends to Uganda and Angola. (See Appendix, p. 71.)

37. **D. lecomteana** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 215 (1927) ; Kew Bull. 1928 : 222. Habit of the preceding ; about 3 ft. high ; flowers red.

Fr.G.: Dindea (Sept.) *Pobéguin* 1699 ! Kindia (May) *Jac.-Fel.* 1643 ! Fouta Djalon *Jac.-Fel.* 553 ; 747. **S.L.:** near Falaba *Sc. Elliot* 5174 ! Erimakuna (Mar.) *Sc. Elliot* 5241 ! (See Appendix, p. 71.)

Imperfectly known species.

1. **D. afzelii** *Hook. f.*—F.T.A. 2 : 449. See under *D. paucistellata* Stapf above.

2. **D. rupicola** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 748 (1921), not of Hutch. & Dalz. (1927). Near *D. decumbens* (P. Beauv.) Triana, with simple hairs on calyx-tube, but with smaller leaves ; in rocky places. Quite possibly the same as *D. pygmaea* A. Chev. & Jac.-Fel.

Lib.: Sinoe Basin—no spec. cited.

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[1] *Melastoma capitatum* G. Don (Gen. Syst. 2 : 764 (1823)) is also this species but the name is illegitimate because of the earlier *M. capitatum* Vahl (Eclog. Amer. 1 : 45 (1796)) which Don himself (see Gen. Syst. 2 : 803) regarded as a distinct species. As it happens, *M. capitatum* Vahl, although based on a different type, is in fact the same species but the name cannot be used as the basis of a new combination in *Dissotis* because the binomial *D. capitata* was first made by Hooker, based on *Heterotis capitata* Benth. which in turn is based on the illegitimate name of *M. capitatum* G. Don. I am grateful to Mr. J. E. Dandy for clarifying this point of nomenclature.

3. **D. conrauii** *Gilg ex Engl.* l.c. 752. Shrub about 5 ft. high, with long-petioled, lanceolate, 5-nerved leaves, in grassland. Near *D. pulcherrima* Gilg and *D. elliotii* Gilg.
Br.Cam.: Bali—no spec. cited.

4. **D. kerstingii** *Gilg ex Engl.* l.c. 752. Near *D. irvingiana* Hook., but with very long internodes and narrowly lanceolate, distinctly serrate leaves.
Togo: Basari—no spec. cited.

5. **D.** sp. Probably new. Herb to 6 ft. high ; flowers red-purple.
Lib.: Mt. Bili, Sanokwele (Dec.) *Barker* 1148 !

20. MEMECYLON Linn.—F.T.A. 2 : 460.

Leaves without well-marked lateral ascending nerves, only the midrib prominent on lower surface ; flowers axillary in compound umbels :

Calyx not reaching more than halfway up the bud, thus leaving the corolla largely exposed well before it opens ; fruits ellipsoid or subglobose :

Inflorescence up to 3 cm. long with branches not exceeding 1 cm. long :

Flowers 1–2 mm. diam. :

Receptacle cupuliform ; fruits ellipsoid or subglobose :

Corolla acute in bud ; calyx subtruncate ; fruit ellipsoid :

Cymes usually well-developed, peduncle more than 5 mm. long, pedicels at least 4 mm. long ; often with more than 5 fruits in each cyme ; leaves elliptic-lanceolate, gradually long-acuminate, 5–12 cm. long, 1·5–5 cm. broad, petiole generally swollen at base ; fruits about 7 mm. broad and 10 mm. long 1. *afzelii*

Cymes contracted, peduncle up to 5 mm. long, pedicels 1–2 mm. long (up to 3 mm. in fruit) ; rarely with more than 2 or 3 fruits in each cyme ; leaves oblong-elliptic, rather abruptly long-acuminate, 8–14 cm. long, 3–6 cm. broad ; fruits about 8 mm. broad and 12 mm. long .. 2. *aylmeri*

Corolla rounded at apex in bud ; fruit ellipsoid or subglobose :

Cymes lax, with peduncle up to 3 cm. long ; calyx sinuate-dentate ; fruits oblong-ellipsoid, about 6 mm. broad and 13 mm. long ; leaves lanceolate to oblong-lanceolate, gradually acuminate, about 15 cm. long and 6 cm. broad ; a sarmentose shrub .. .. 3. *adamii*

Cymes dense, with peduncle less than 2 mm. long, flowers glomerate ; fruits subglobose ; leaves oblong-elliptic, rather abruptly long- or caudate-acuminate (acumen about 2 cm. long), 10–14 cm. long, 3–5 cm. broad .. 4. *viride*

Receptacle patelliform ; fruits subglobose ; cymes lax :

Corolla acute in bud ; leaves elliptic, obtuse, acute, or obtusely acuminate at apex, 6–14 cm. long, 2·5–5·5 cm. broad ; cymes often borne on leafless parts of the stem below the leaves ; fruits about 8 mm. diam. .. 5. *normandii*

Corolla rounded at apex in bud ; leaves oblong-elliptic, rather abruptly long-acuminate, 8–14 cm. long, 3–6 cm. broad ; fruits about 10 mm. diam. 6. *candidum*

Flowers up to 1 mm. diam., very numerous in well-branched cymes ; fruits subglobose, 5–7 mm. diam. ; leaves elliptic, long-acuminate, 5–8 cm. long, 1·5–4 cm. broad .. .. 7. *dasyanthum*

Inflorescence 4–7 cm. long, lateral branches (sometimes themselves branched) 1–2 cm. long, usually 4 together in 2 or 3 whorls ; leaves elliptic to oblong, 9–17 cm. long, 3–7 cm. broad, caudate-acuminate ; transverse and intra-marginal nerves just visible ; fruits oblong-ellipsoid, about 6 mm. broad and 12 mm. long 8. *obanense*

Calyx reaching well beyond halfway up the bud, thus covering most of the corolla until just before it opens ; fruits subglobose :

Calyx about 2 mm. long, subtruncate or very shortly and irregularly lobed ; cymes well-branched, many-flowered ; leaves elliptic, long-acuminate, 6–12 cm. long, 2·5–6 cm. broad, drying greyish-green ; fruits about 8 mm. diam. 9. *polyanthemos*

Calyx 3–4 mm. long, with distinct broadly triangular lobes ; leaves oblong or oblong-lanceolate, rather abruptly acuminate, 6–20 cm. long, 3–7 cm. broad ; leaves thickly coriaceous with inrolled margins, drying reddish-brown ; fruits 13–17 mm. diam. .. .. 10. *lateriflorum*

Leaves with well-marked lateral ascending nerves prominent on lower surface :

Flowers in lax inflorescences ; pedicels at least 2 mm. long ; peduncles and pedicels both well-developed :

Inflorescences densely puberulous, bracteoles at the base of the pedicels and not immediately below the calyx-tube ; inflorescences terminal as well as axillary, at least 5 cm. long :

Branchlets, petioles and main nerves beneath quite glabrous ; flowers very numerous in fairly long-pedunculate cymes, sometimes nearly as long as the leaves ; leaves ovate or ovate-elliptic, obtuse at base or becoming rounded or cordate, with short flattened petioles, shortly acuminate, 12–18 cm. long, 6–10 cm. broad ; transverse nerves more or less conspicuous beneath ; leaves often purplish-brown when dry ; fruits globose, 6 mm. in diam. .. .. 11. *blakeoides*

Branchlets, petioles and main nerves beneath puberulous ; inflorescences 5–7 cm. long ; petiole 8–11 mm. long, lamina elliptic-lanceolate, cuneate at base, acuminate at apex, 10–14 cm. long, 4·5–5 cm. broad, transverse nerves visible, except near the base .. .. 12. *fleuryi*

Inflorescences glabrous :

Bracteoles immediately below the calyx-tube ; transverse nerves inconspicuous :

Leaves 4–6·5 cm. broad, 7–12 cm. long, coriaceous, ovate to ovate-elliptic, obtuse to cuneate at base, strongly 3-nerved, main nerves impressed above ; flowers in axillary cymes up to 2 cm. long .. .. 13. *dinklagei*

Leaves 2–4·5 cm. broad, 5–9 cm. long, papery, elliptic, cuneate at the base, gradually acuminate, 3-nerved, with lateral ascending nerves considerably weaker than the midrib, impressed above ; flowers in axillary cymes up to 2 cm. long ; fruit 5 mm. in diam. .. .. 14. *barteri*

Bracteoles at the base of the pedicels ; inflorescences mostly of pedunculate umbels or compound umbels :

Lateral nerves equally prominent with the transverse nerves and looped with them almost from the base :

Nerves impressed above ; pedicels 4–5 mm. long ; leaves oblong-elliptic to broadly ovate, rounded or slightly cuneate at base, acutely acuminate, with 6–15 pairs of transverse nerves prominent beneath, looping with the prominent ascending laterals ; inflorescence of 1–3 axillary pedunculate umbels, with long pedicels .. .. 15. *zenkeri*

Nerves slightly prominent above ; pedicels 1–2 mm. ; leaves oblong-elliptic, obtuse to cuneate at base, acuminate, with 8–12 pairs of transverse nerves looping with the rather weaker ascending laterals ; inflorescence a 2–3-times branched compound umbel, with short pedicels ; fruits ellipsoid, about 1 cm. long .. .. 16. *englerianum*

Lateral nerves considerably more prominent than the transverse nerves, more or less straight and not bowed to loop with the transverse nerves except near the leaf apex :

Pedicels 3–5 mm. long, inflorescences of simple pedunculate 2–3-flowered umbels ; leaves cuneate at base, up to 9 cm. long and 4·5 cm. broad :

Leaves thin, elliptic to ovate, gradually long-acuminate, acumen about ⅓ as long at the blade, 4–7 cm. long, 1·8–3 cm. broad ; peduncles about 5 mm. long, like the pedicels, very slender .. .. 17. *golaense*

Leaves coriaceous, elliptic, shortly and gradually acuminate, narrowed to the acutely cuneate base, 4–9 cm. long, 3–4·5 cm. broad ; inflorescence of several pedunculate 2–3-flowered umbels at the nodes of older branchlets below the leaves ; peduncles and pedicels similar to above but stouter .. 18. *fosteri*

Pedicels 5–8 mm. long, inflorescences simple or branched, several-flowered ; leaves broadly elliptic to ovate, obtuse, rounded or sometimes cuneate at base, shortly acuminate, usually over 6·5 cm. long and 3 cm. broad :

Inflorescences in axils of leafy shoots ; leaves obtuse to cuneate at base, 6·5–11 cm. long, 3–7 cm. broad, main lateral nerves diverging from the midrib right at the base of the lamina .. .. .. 19. *cinnamomoides*

Inflorescences mainly on older branchlets below the leaves ; leaves always rounded at base, 7–18 cm. long, 4·5–10 cm. broad, main laterals diverging from the midrib well above the base of the lamina .. 20. *memecyloides*

Flowers in dense sessile or pedunculate glomerules or fascicles ; flowers sessile or subsessile, or if pedicels well-developed then peduncle very short and flowers fasciculate ; bracts and bracteoles persistent :

Inflorescences pedunculate, peduncle 5–12 mm. long, 4-winged ; flowers sessile or subsessile, 6–16 together in a glomerule ; branchlets 4-winged ; leaves rather shortly petiolate, ovate, or ovate-elliptic, cordate at base, gradually acuminate, 5·5–13·5 cm. long, 3–6 cm. broad, strongly 3-nerved with 6–10 pairs of prominent transverse nerves .. .. 21. *meiklei*

Inflorescences sessile or subsessile (peduncle up to 2 mm. long) in the leaf-axils :

Leaves cordate or subcordate at base, shortly petiolate, ovate-lanceolate, rather long-acuminate, 5–15 cm. long, 2·5–6 cm. broad ; flowers 2–3, sessile in the leaf axils ; fruits 6–8 mm. diam., sessile, or on pedicels 1–2 mm. long 22. *guineense*

Leaves cuneate or obtuse, rarely rounded, at base :

Lateral nerves more or less straight and not bowed to loop with the transverse nerves except near the leaf apex :

Flowers 2–3 in each axil, subsessile ; leaves membranous, nerves not prominent above, distinctly petiolate, elliptic or ovate-elliptic, rather long-acuminate, 3-nerved, with rather faint transverse nerves .. .. 23. *membranifolium*

Flowers several to numerous in dense axillary, sessile or very shortly pedunculate fascicles ; pedicels up to 3·5 mm. long in mature flowers, bracts and bracteoles persistent and conspicuous ; leaves leathery, ovate to ovate-elliptic, shortly and obtusely acuminate, 5–12 cm. long, 2–6 cm. broad, lateral and transverse nerves prominent above, with conspicuous transverse venation prominent on both surfaces .. .. 24. *fasciculare*

Lateral nerves bowed to loop with the 6–15 pairs of strong transverse nerves, both types of nerves impressed above and prominent beneath ; for other characters see above .. .. 15. *zenkeri*

1. **M. afzelii** *G. Don* Gen. Syst. 2 : 655 (1832) ; Keay in Kew Bull. 1952 : 162 (excl. syn. *M. polyanthemos* Hook. f.) ; Jac.-Fel. in Bull. I.F.A.N. 15 : 988, figs. 4–5, (1953). *M. polyanthemos* Hook. f. in F.T.A. 2 : 463, partly (spec. *Afzelius*). *M. polyanthemos* of F.W.T.A., ed. 1, 1 : 214, partly. Understorey tree or shrub, in forest, to 20 ft. high ; petals mauve.
   Fr.G.: Kindia (fr. June) *Jac.-Fel.* 426 ! **S.L.:** *Afzelius* ! Bonthe Isl. (Mar.) *Deighton* 2469 ! Boma (Apr.) *Deighton* 3718 ! Njala (fl. Apr., fr. May–June) *Deighton* 3535 ! 3536 ! Kofiu Mt. (fr. Jan.) *Sc. Elliot* 4597 ! **Iv.C.:** Grand Bassam *Chev.* 33089. Mid. Cavally *Chev.* 19287. Agneby *Chev.* 17047 ; 17081. **G.C.:** Amedzope (May) *Scholes* 60 ! **Togo:** Misahöhe (Apr., May) *Baumann* 551 ! **S.Nig.:** Omo F.R. (fl. Apr., Nov., fr. Mar., Apr.) *Tamajong* FHI 16924 ! 20985 ! (See Appendix, p. 72.)
2. **M. aylmeri** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 214 (1927) ; Kew Bull. 1928 : 223 ; Jac.-Fel. l.c. 993, fig. 6 (1953). Forest shrub, to 12 ft. high ; flowers pale blue.
   Fr.G.: Mt. Nzo (fr. Mar.) *Chev.* 21002 ! **S.L.:** Kenema *Aylmer* 627 ! **Lib.:** Yeh R. (Oct.) *Linder* 994 ! Moylakwelli (Oct.) *Linder* 1285 ! Boporo (Nov.) *Baldwin* 10385 ! Mt. Bobei, Sanokwele (Sept.) *Baldwin* 9563 ! **G.C.:** Owabi (Mar.) *Andoh* FH 4381 !
3. **M. adamii** *Jac.-Fel.* in Bull. I.F.A.N. 15 : 992 (1953). Sarmentose shrub, about 6 ft. high.
   Fr.G.: Mt. Ziama *Adam* 4088 ! 4089 !
4. **M. viride** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 214 (1927) ; Kew Bull. 1928 : 223. A glabrous shrub.
   S.Nig.: Oban *Talbot* 496 ! s.n. !

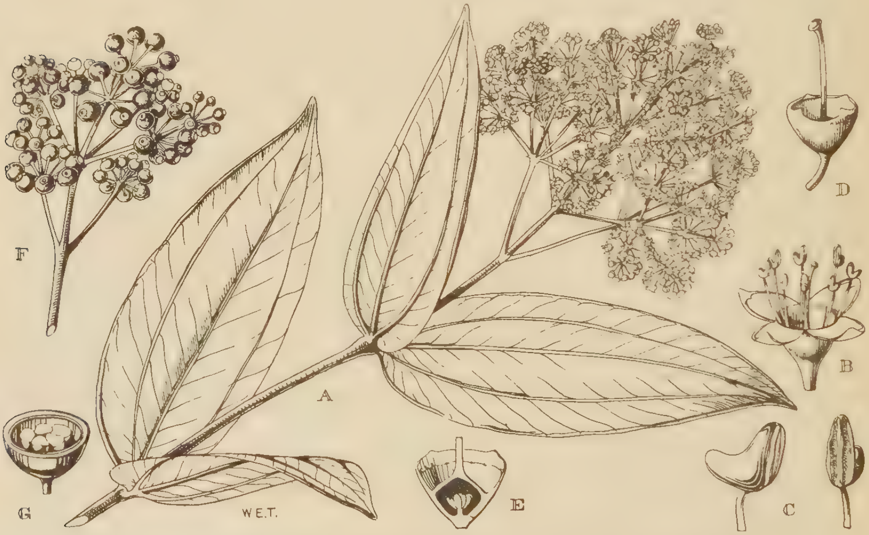

FIG. 102.—MEMECYLON BLAKEOIDES *G. Don* (MELASTOMATACEAE).

A, flowering branch. B, flower. C, stamens. D, calyx with style. E, vertical section of ovary. F, infructescence. G, cross-section of fruit.

5. **M. normandii** *Jac.-Fel.* l.c. 995, fig. 7 (1953). *M. polyanthemos* of F.W.T.A., ed. 1, 1 : 214, partly, not of Hook. f. Tree to 30 ft. high, with subterete branches ; fruits purple.
   Fr.G.: *Pobéguin* 2170 ! Kindia (fl. & fr. Oct.) *Jac.-Fel.* 400 ! Pita (fr. Dec.) *Jac.-Fel.* 692 ! **S.L.:** Kahreni (fr. Apr.) *Sc. Elliot* 5636 ! Kukuna (fr. Jan.) *Sc. Elliot* 4686 ! Matotoka (July) *Thomas* 1265 ! Ezi (fr. Feb.) *Thomas* 2338 ! Jigaya (Nov.) *Thomas* 2722 ! **G.C.:** Bonsa Su (May) *Vigne* 1998 !
6. **M. candidum** *Gilg* in Engl. Monogr. Afr. Melastom. 43 (1898). A glabrous shrub, or small tree ; flowers usually white.
   S.Nig.: Oban *Talbot* 696 ! 1717 ! **Br.Cam.:** S. Bakossi F.R., Kumba (May) *Olorunfemi* FHI 30567 ! Also in French Cameroons.
7. **M. dasyanthum** *Gilg & Ledermann ex Engl.* Pflanzenw. Afr. 3, 2 : 768 (1921). A small tree.
   Br.Cam.: Likomba (fr. Oct.) *Mildbr.* 10534 ! Fonfuka, Bamenda (fr. May) *Maitland* 1373 ! Bali F.R., Bamenda (fr. May) *Ujor* FHI 30371 ! Also in French Cameroons.
8. **M. obanense** *Bak. f.* in Cat. Talb. 37 (1913). Shrub to 12 ft. high.
   S.Nig.: Oban *Talbot* 485 ! 486 ! 1376 ! Itu Dist. (fr. June) *Ujor* FHI 27986 !
9. **M. polyanthemos** *Hook. f.* in F.T.A. 2 : 463 (1871), partly (spec. *Mann*) ; Gilg in Engl. Monogr. Afr. Melastom. 44, partly ; F.W.T.A., ed. 1, 1 : 214, partly ; Aubrév. Fl. For. C. Iv. 3 : 76, t. 272 A ; Jac.-Fel. l.c. 997, fig. 8. *M. simii* of Chev. Bot. 278, not of Stapf. Tree to 25 ft. high ; flowers blue.
   Fr.G.: Macenta (fl. Mar., fr. May) *Jac.-Fel.* 901 ! 1560 ! **S.L.:** Bagroo R. (Apr.) *Mann* 851 ! Bandajuma (May) *Aylmer* 76 ! Gola Forest (Apr.) *Small* 594 ! **Lib.:** Dukwia R. (fl. Feb., fr. Oct.) *Cooper* 97 ! 289 ! **Iv.C.:** Cavally *Chev.* 19807.
10. **M. lateriflorum** (*G. Don*) *Brem.* in Fedde Rep. 37 : 196 (1934) ; Jac.-Fel. l.c. 1000. *Pavetta lateriflora* G. Don Gen. Syst. 3 : 575 (1834). *Memecylon donianum* Planch. in Fl. Nigrit. 357 (1849) ; F.T.A. 2 : 463 ; Gilg l.c. 44 ; F.W.T.A., ed. 1, 1 : 214 ; Aubrév. l.c. 3 : 76, t. 270. *M. simii* Stapf in J. Linn. Soc. 37 : 99 (1905). *M. applanatum* Bak. f. in Cat. Talb. 37 (1913). *M. polyanthemos* of Chev. Bot. 278, partly, not of Hook. f. Small tree of forest, to 30 ft. high ; stamens blue, petals white.
    Fr.G.: R. Samou *Jac.-Fel.* 405. **S.L.:** *Don* ! Yonibana (Oct.) *Thomas* 4204 ! 4237 ! Gorahun (fr. Mar.) *Deighton* 4105 ! Kambui Hills (fr. Nov.) *Edwardson* 5 ! **Lib.:** Sinoe Basin *Whyte* ! Duo, Sinoe (Mar.) *Baldwin* 11359 ! **Iv.C.:** Aboisso (Apr.) *Chev.* 16299 ! **G.C.:** Dompim *Vigne* 1969 ! Mampong Scarp (May) *Vigne* 1134 ! **S.Nig.:** Oban *Talbot* 1606 ! (See Appendix, p. 72.)

11. **M. blakeoides** *G. Don* Gen. Syst. 2 : 655 (1832) ; Keay in Kew Bull. 1952 : 163. *M. spathandra* Blume Mus. Bot. 1 : 361 (1851) ; Gilg l.c. 38 ; F.W.T.A., ed. 1, 1 : 215. *Spathandra caerulea* Guill. & Perr. (1833). *M. caerulea* (Guill. & Perr.) Hook. f. in F.T.A. 2 : 461 (1871), not of Jack (1820) ; Chev. Bot. 277. *M. strychnoides* Bak. in Kew Bull. 1895 : 105 ; F.W.T.A., ed. 1, 1 : 215. *M. millenii* Gilg l.c. 38 (1898). Tree of swamp forest by rivers, with shrubby habit, to 70 ft. high ; flowers with white petals and blue anthers ; fruits black when ripe.

Sen.: *Perrottet ; Heudelot* ! **Fr.G.:** R. Lanfofome (Mar.) *Pobéguin* 906 ! Near Mamou (Mar.) *Dalz.* 8382 ! **S.L.:** *Don* ! *Whitfield* ! *T. Vogel* 188 ! R. Bagroo (Apr.) *Mann* 827 ! Luseniya (fr. Dec.) *Sc. Elliot* 4093 ! Waterloo *Lane-Poole* 427 ! **Lib.:** Monrovia (Apr.) *Bequaert* 178 ! *Whyte* ! Kakatown *Whyte* ! Totokwelli, Medina (Oct.) *Linder* 1305 ! Duport (Nov.) *Linder* 1477 ! **G.C.:** Axim (fl. & fr. Nov.) *Vigne* 1453 ! **S.Nig.:** Lagos (Oct., Nov.) *Millen* 168 ! *Dalz.* 1184 ! Okomu F.R. (fl. Mar., fr. May) *Richards* 3278 ! *Ross* 200 ! Sapoba (Aug., Oct.) *A. F. Ross* 206 ! *Kennedy* 1757 ! Extends to Cabinda. (See Appendix, p. 72.)

12. **M. fleuryi** *Jac.-Fel.* in Bull. Mus. Hist. Nat. Sér. 2, 7 : 148 (1935) ; Aubrév. l.c. 3 : 78, t. 272 B. Shrub, in forest ; remarkable for its pubescence.

Iv.C.: Grand Bassam (Feb.) *Fleury* in *Hb. Chev.* 33073. Abidjan (Feb.) *Aubrév.* 887 ! **G.C.:** Beyin, W.P. (Nov.) *Vigne* 1453 !

13. **M. dinklagei** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 764 (1921) ; Hutch. & Dalz. in Kew Bull. 1928 : 223 ; Aubrév. l.c. 3 : 78, t. 272 C. Shrub on sandy ground.

S.L.: Yonibana (Nov.) *Thomas* 4816 ! **Lib.:** Grand Bassa (Sept.) *Dinklage* 2032 ! **Iv.C.:** Port Bouët *Aubrév.* 1652 !

14. **M. barteri** *Hook. f.* in F.T.A. 2 : 462 (1871) ; Gilg l.c. 41. *M. dinklagei* of Chev. Bot. 277, not of Gilg (*fide* Hutch.). A much-branched evergreen shrub, about 8 ft. or more high ; flowers small white, very fugacious ; berries black-purple.

Fr.G.: Kouria (Sept.) *Chev.* 14777. **S.Nig.:** Lagos (Mar.) *Barter* 2152 ! *Moloney* ! *Dalz.* 1056 ! 1233 ! Ovim, Okigwi (Dec.) *Jones* FHI 6201 !

15. **M. zenkeri** *Gilg* in Engl. Monogr. Afr. Melastom. 43, t. 10 D (1898). *M. zenkeri* var. *parvifolium* Bak. f. in Cat. Talb. 38 (1913). *M. johnstonii* Gilg ex Engl. Pflanzenw. Afr. 3, 2 : 766 (1921). Shrub to 12 ft. high with 4-angled branches ; petals white ; stamens blue.

S.Nig.: Oban *Talbot* 1723 ! 1739 ! Calabar (Feb.) *Mann* 2285 ! **Br.Cam.:** *Preuss* 1373 ! Mopanya (Mar.) *Kalbreyer* 174 ! Rio del Rey *Johnston* ! Also in French Cameroons.

16. **M. englerianum** *Cogn.* in DC. Monogr. 7 : 1194 (1891) ; Gilg. l.c. 43. *M. nigrescens* Engl. Bot. Jahrb. 7 : 338 (1884), not of Hook. & Arn. (1833). Shrub, to 12 ft. high, with violet-blue flowers.

S.Nig.: Usonigbe F.R. (fr. Nov.) *Keay* FHI 25576 ! **Br.Cam.:** Likomba (Dec.) *Mildbr.* 10757 ! S. Bakundu F.R. (fr. Mar.) *Brenan* 9480 ! Mungo (Oct.) *Buchholz.*

17. **M. golaense** *Bak. f.* in J. Bot. 49 : 320 (1911) ; Aubrév. l.c. 3 : 80, t. 272 D. Shrub or small tree to 30 ft. high, with yellow-green bark ; petals dark ultramarine colour at base, shading off to white.

S.L.: Gola Forest (Apr.) *Small* 634 ! **Lib.:** Gola Forest (Apr.) *Bunting* ! **Iv.C.:** Mt. Momi (Apr.) *Aubrév.* 1173 !

18. **M. fosteri** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 215 (1927) ; Kew Bull. 1928 : 223. Shrub or small tree, to 15 ft. high, petals pale blue.

S.Nig.: (Oct.) *Foster* 359 ! Idanre Hills (Oct.) *Keay* FHI 21564 ! 22654 ! *Brenan* 8666 !

19. **M. cinnamomoides** *G. Don* Gen. Syst. 2 : 655 (1832) ; Keay in Kew Bull. 1952 : 162 ; Gilg l.c. 39. *M. vogelii* of Aubrév. l.c. 3 : 78, t. 271 A, not of Naud. Shrub or spreading tree, to 30 ft. high ; flowers blue.

S.L.: *Afzelius.* Talla Hills (Feb.) *Sc. Elliot* 4916*b* ! Magbile (fr. Dec.) *Thomas* 5918 ! 6200 ! 9849 ! **Iv.C.:** Rasso *Aubrév.* 1697 ! And other localities. **G.C.:** Kumasi (Mar.) *Vigne* 1645 ! **Togo:** Kpandu (Mar.) *Robertson* 107 !

20. **M. memecyloides** (*Benth.*) *Exell* in Cat. S. Tomé 181 (1944). *Spathandra memecyloides* Benth. in Fl. Nigrit. 357 (1849). *M. vogelii* Naud. (1852) ; F.T.A. 2 : 462 ; Gilg l.c. 41 ; F.W.T.A., ed. 1, 1 : 215. *M. cinnamomoides* of F.W.T.A., ed. 1, 1 : 215, partly. Spreading tree of swamp forest, to 50 ft. high ; petals pale blue ; fruit deep blue.

G.C.: Ancobra R. (young fr. Dec.) *Johnson* 920 ! Afram Plains (May) *Kitson* 1127 ! Cape Coast *Brass* ! **S.Nig.:** Oni, Epe Dist. *Thompson* 4 ! Shasha F.R. (Jan., Apr.) *Ross* 241 ! *Richards* 3014 ! Degema *Talbot* 3768 ! **F.Po:** *T. Vogel* 149 ! *Barter* ! Also in Principe.

[The areas of this species and of *M. cinnamomoides* G. Don overlap in the Gold Coast where several specimens which appear to be intermediate between the two species have been collected.]

21. **M. meiklei** *Keay* in Kew Bull. 1952 : 163. Spreading shrub, about 10 ft. high ; petals mauve-pink, filaments and style bright blue.

S.Nig.: Ibadan (Mar.) *Meikle* 1253 !

22. **M. guineense** *Keay* l.c. 163 (1952). *M. sessile* A. Chev. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 215 (1927), not of Wall. ex Wight & Arn. (1834) ; Chev. Bot. 278, name only ; Chev. in Bull. Mus. Hist. Nat. Sér. 2, 4 : 687 (1932) ; Aubrév. l.c. 3 : 76, t. 271 C. Slender-stemmed shrub, 3–9 ft. high (or tree to 36 ft., *fide* Richards) in dense forest ; flowers blue, fruits purple.

Lib.: Dukwia R. (Feb.) *Cooper* 251 ! **Iv.C.:** between the Sassandra and Cavally (July) *Chev.* 19243 ! 19283 ! Sanvi (fr. Mar.) *Chev.* 17836 ! Yapo *Aubrév.* 598 ! **S.Nig.:** Okomu F.R. (fl. & fr. Dec.–Feb.) *Brenan* 8422 ! 8753 ! 9142 ! 9159 ! Shasha F.R. (fl. & fr. May) *Richards* 3475 !

23. **M. membranifolium** *Hook. f.* in F.T.A. 2 : 462 (1871) ; Gilg l.c. 41. *M. longicauda* Gilg l.c. 40, t. 10 E (1898). *M. leucocarpum* Gilg l.c. (1898). *M. nanum* A. Chev. Bot. 278, name only. Shrub to 10 ft. high, in forest, calyx-tube blue-violet, lobes red-violet, petals and filaments vivid blue ; fruits deep blue.

Iv.C.: *fide* Chev. *l.c.* **G.C.:** Begoro (fl. & fr. Nov.) *Vigne* 4276 ! **Togo:** Amedzofwe (Feb.) *Irvine* 153 ! Alavanyo (fl. Sept., fr. Oct.) *St. Clair Thompson* 3570 ! **S.Nig.:** Okomu F.R. (fl. & fr. Dec., Jan.) *Brenan* 8581 ! 8845 ! 8900 ! Oban *Talbot* ! **Br.Cam.:** Ambas Bay (Feb.) *Mann* 8 ! Johann-Albrechtshöhe (Dec.) *Staudt* 471 ! **F.Po:** (Jan.) *Mann* 191 ! Also in French Cameroons.

24. **M. fasciculare** (*Planch. ex Benth.*) *Naud.*—F.T.A. 2 : 463 ; Gilg l.c. 41 ; Chev. Bot. 277 ; Aubrév. l.c. 3 : 78, t. 271 B. *M. cinnamomoides* of Chev. Bot. 277, not of Don. A shrub, to 10 ft. high, flowers pinkish, fruits black when ripe.

Fr.G.: *Heudelot* 909 ! *Farmar* 289 ! Various localities *fide* Chev. *l.c.* **S.L.:** *Afzelius* ! *Don* ! Talla Hills (fl. & fr. Feb.) *Sc. Elliot* 4830 ! 4916*a* ! Bonthe (Feb.) *Dalz.* 997 ! Sussex (Apr.) *Deighton* 4124 ! York (May) *Deighton* 5518 ! **Iv.C.:** Mt. Dou *Aubrév.* 1071.

Imperfectly known species.

1. **M. polyneuron** *Gilg* in Engl. Monogr. Afr. Melastom. 41 (1898). Type specimen not seen by Hutch. & Dalz. and presumably now destroyed.

S.L.: *Afzelius* (Hb. Berlin).

2. **M. fernandianum** *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 765 (1921) ; Mildbr. in Wiss. Ergebn. 1910–11 : 188, name only. Possibly the same as *M. membranifolium* Hook. f.

F.Po: Bokoko, 2,000 ft. *Mildbr.* 6824.

3. **M. liberiae** *Gilg ex Engl.* l.c. 3, 2 : 768 (1921). No specimen cited ; description very inadequate.

Lib.: Monrovia.

4. **M.** sp. **A.** Tree, 30–35 ft. high ; leaves lanceolate, 17–27 cm. long, 6–7·5 cm. broad, not 3-nerved ; flowers not known. Possibly this may prove to be *M. liberiae* Gilg ex Engl.

Lib.: Dukwia R. (fr. May) *Linder* 414 !

69. COMBRETACEAE

Trees or shrubs, often scandent. Leaves opposite, alternate or rarely verticillate, simple, exstipulate. Flowers spicate or racemose, mostly small, hermaphrodite, rarely unisexual. Calyx-tube adnate to the ovary ; limb 4–8-fid or -lobed, lobes valvate. Petals 4–5 or none, rarely many, small, imbricate or valvate. Stamens 4–10, rarely more ; filaments inflexed in bud ; anthers versatile, didymous, opening lengthwise by slits. Disk epigynous. Ovary inferior, rarely half-inferior, 1-celled ; style simple ; ovules 2–6, suspended from the apex of the ovary by slender funicles. Fruit often winged, rarely dehiscent. Seed pendulous, without endosperm ; embryo with convolute, plicate or contorted cotyledons and small radicle.

Mainly tropics and subtropics. Recognized by the exstipulate simple leaves, inferior ovary, and often winged fruits.

Petals present :

Ovary half-superior ; fruits not winged, 5–8 cm. diam., succulent, drupaceous ; leaves alternate .. .. 1. **Strephonema**

Ovary completely inferior ; fruits usually winged, or at least ridged :

Upper receptacle (calyx-tube) and calyx-lobes deciduous before the fruit ripens, fruit winged, or at least ridged, not linear :

Style free from the upper receptacle :

Flowers all hermaphrodite ; fruit 4–5-winged or ridged.. .. 2. **Combretum**

Flowers hermaphrodite and male in the same inflorescence ; fruit 2–4-winged 3. **Pteleopsis**

Style adnate to the upper receptacle, at least at the base .. 4. **Quisqualis**

Upper receptacle and calyx-lobes persistent at the time of fruiting ; fruit linear 3–4 cm. long, densely silky-villous ; flowers in small, often bracteate heads ; whole plant covered with small black glands .. .. 5. **Guiera**

Petals absent :

Receptacle without adnate bracteoles ; fruits 2-winged (except the exotic *Terminalia catappa*) ; leaves alternate, rarely sub-verticellate :

Flowers in spikes, or spike-like racemes, never in heads .. .. 6. **Terminalia**

Flowers and fruits crowded into dense heads :

Petiole with a pair of glands, leaves glabrous, coriaceous ; stamens 5, fruits not beaked ; in mangrove-swamps and other coastal habitats .. 7. **Conocarpus**

Petiole without glands, leaves pubescent, chartaceous ; stamens 10 ; fruits distinctly beaked .. .. 8. **Anogeissus**

Receptacle with two adnate bracteoles ; fruits elongate-obovoid, ribbed, but scarcely winged ; flowers in spikes ; leaves opposite, glabrous, coriaceous ; in mangrove swamps .. .. 9. **Laguncularia**

1. STREPHONEMA Hook. f.—F.T.A. 2 : 484, under *Lythraceae*.

Leaves elliptic, rounded at base, shortly acuminate, 12–17 cm. long, up to 7 cm. broad, with about 6 pairs of lateral nerves, glabrous and almost veinless beneath ; inflorescence axillary, very short and subumbellate ; pedicels glabrous, about 0·5 cm. long ; calyx glabrous .. .. 1. *mannii*

Leaves oblong, rounded at base, acutely acuminate, about 25 cm. long, 6–8 cm. broad, pilose in the axils of the nerves beneath ; lateral nerves 9–11 pairs, with slender parallel tertiary nerves beneath ; inflorescence raceme-like, about 6 cm. long, everywhere brown-tomentose .. .. 2. *pseudocola*

1. **S. mannii** *Hook. f.*—F.T.A. 2 : 484 ; Engl. & Diels Monogr. Afr. Combretac. 1. A glabrous shrub, to 20 ft. high ; by rivers.
S.Nig.: Eket *Talbot* ! Old Calabar R. (Feb.) *Mann* 2293 ! **Br.Cam.:** Muyuku, Victoria (May) *Maitland* 1145 ! Also in Gabon.

2. **S. pseudocola** *A. Chev.* in Bull. Soc. Bot. Fr. 58, Mém. 8 : 172 (1912) ; Aubrév. Fl. For. C. Iv. 3 : 60, t. 265. *S. apolloniense* J. J. Clark in Kew Bull. 1913 : 76. A forest tree, up to 70 ft. ; flowers white ; fruit 2–3 in. broad, nearly 2 in. long, rough, verrucose with a long acute beak ; seed solitary, with 2 cotyledons somewhat resembling those of a kola nut.
S.L.: Baiima (Sept.) *Deighton* 3055 ! **Lib.:** Gbanga (Sept.) *Linder* 767 ! Dukwia R. (Nov.) *Cooper* 121 ! Kitoma (fr. Apr.) *Harley* 1124 ! Tappita (Aug.) *Baldwin* 9116 ! Browntown, Tchien (Aug.) *Baldwin* 7083 ! Loffa R. (fr. Dec.) *Baldwin* 10947 ! **Iv.C.:** Prolo (Aug.) *Chev.* 19870. Mbago (fr. Feb.) *Chev.* 16189. Abidjan *Aubrév.* 61 ! 128 ! And various other localities. **G.C.:** Nkwanta, W. Apollonia (Aug.) *Chipp* 232 ! (See Appendix, p. 81.)

2. COMBRETUM Loefl.—F.T.A. 2 : 419.[1]

Suffrutices with short, erect stems, usually herbaceous, arising from a woody rootstock, appearing in savannah soon after grass fires and flowering within a few weeks :

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[1] There is a most unsatisfactory revision of the West African species of *Combretum* by G. Roberty in Candollea 11 : 39–108 (1948). No reference is made to it here as the citation of synonyms and of misapplied names would only confuse.

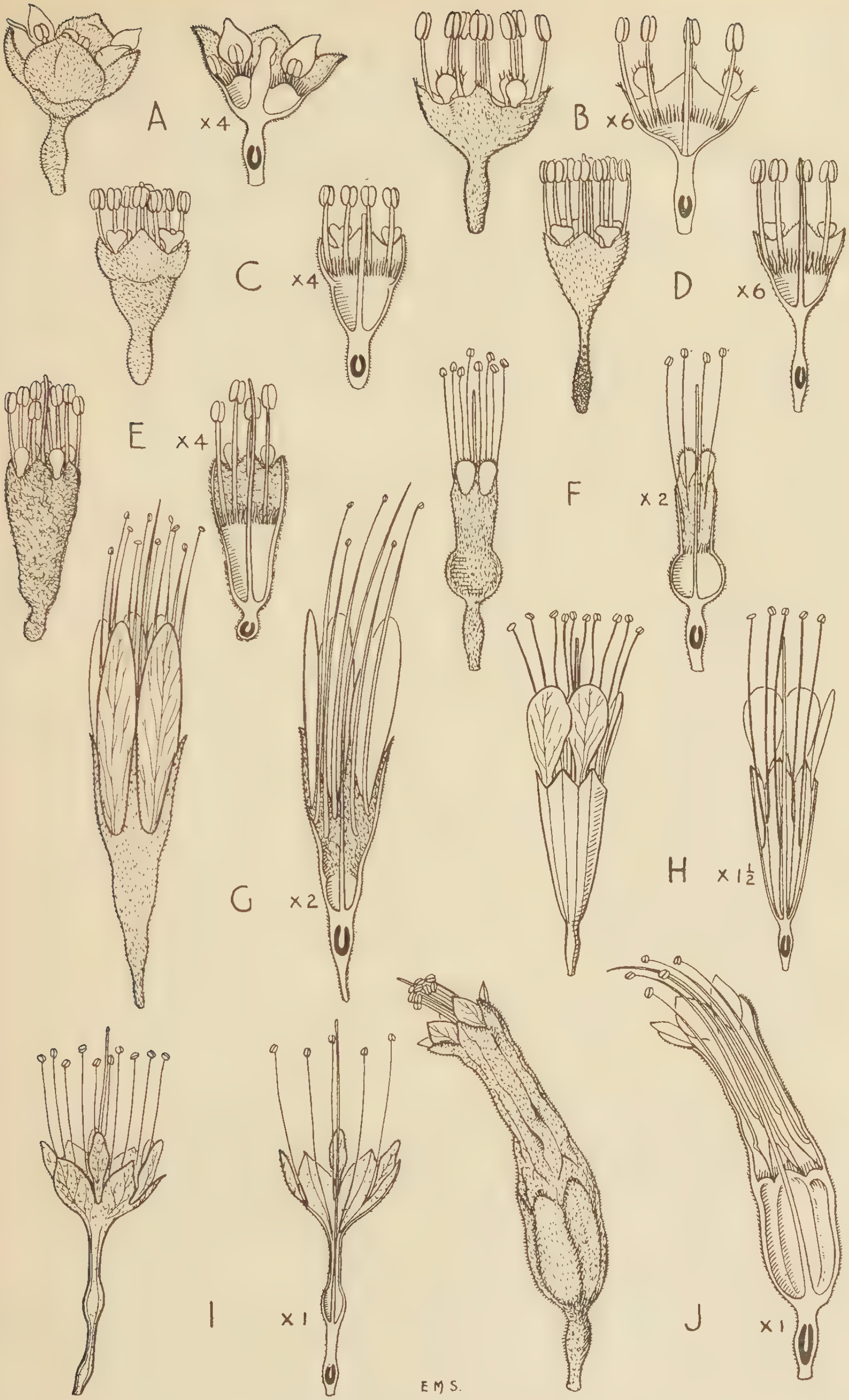

FIG. 103.—COMBRETUM SPP. (COMBRETACEAE).

A, *C. excelsum* Keay (*Keay* FHI 28147). B, *C. nigricans* var. *elliotii* (Engl. & Diels) Aubrév. (*Ryan* 61). C, *C. lamprocarpum* Diels (*Keay* FHI 16270). D, *C. binderianum* Kotschy (*Lely* P. 11). E, *C. fuscum* Planch. ex Benth. (*Onochie* FHI 19150). F, *C. lecardii* Engl. & Diels (*Pirie* 34). G, *C. dolichopetalum* Engl. & Diels (*Keay* FHI 28321). H, *C. grandiflorum* G. Don (*Cooper* 54). I, *C. constrictum* (Benth.) Laws. (*Thornewill* 62). J, *C. bracteatum* (Laws.) Engl. & Diels (*Keay* FHI 28324).

Stem and leaves glabrous, glutinous when young :

Leaves with petiole 1–2 cm. long, lamina lanceolate, acute at both ends, 5–11 cm. long, 1–4 cm. broad ; flowers in spikes, up to 15 cm. long, borne towards the base of the stems .. .. 1. *bauchiense*

Leaves subsessile, linear, 6–7 cm. long, 3–5 mm. broad ; flowers clustered towards the ends of 1–3 cm. long peduncles, borne at the ends of the branches 2. *lineare*

Stem and leaves (at least on the lower surface) densely tomentellous, or silky-tomentose:

Upper receptacle cup-shaped ; disk with a free margin ; petals clawed, spreading ; leaves ovate, obtuse at base, acute at apex, 8–11 cm. long, 3·5–6·5 cm. broad, very shortly tomentellous beneath .. .. 3. *relictum*

Upper receptacle campanulate ; disk wholly adnate ; petals not clawed, incurved ; leaves obovate-elliptic to narrowly elliptic, rounded or obtuse at each end, mucronate at apex, 4–12 cm. long, 0·8–5 cm. broad, more or less densely silky-tomentose and very prominently reticulate beneath .. .. 4. *sericeum*

Trees, shrubs and lianes :

Flowers 4-merous ; fruits 4-winged [1]:

†Petals and filaments white, cream or yellow :

Stamens shorter than the petals ; filaments about 1 mm. long ; upper receptacle very shallowly cup-shaped ; disk well-developed, glabrous :

Leaves rounded at base, truncate to very slightly acuminate at apex, densely tomentose beneath ; lamina broadly elliptic, 3·5–8 cm. long, 2–5 cm. broad 5. *tomentosum*

Leaves deeply cordate to auriculate at base, distinctly acuminate, puberulous to glabrescent beneath ; lamina oblong, 8–28 cm. long, 5–12·5 cm. broad (see fig. 103 A) .. .. 6. *excelsum*

Stamens longer than the petals ; filaments much exceeding 1 mm. long :

Trees and erect shrubs, always in savannah :

Petals ciliate around the margin (see fig. 103 B) :

Undersurface of leaves clothed with white scales, usually concealed on young leaves by a dense indumentum of long silky hairs ; venation very prominent beneath, not prominent above ; lamina more or less elliptic or ovate, acute or acuminate at apex, 6–18 cm. long, 3–10 cm. broad ; flowers densely hairy ; fruits 1·5–2 cm. long ; leaves and fruits never reddish-brown ; bark of bole and older branches dark grey, deeply fissured .. .. .. 7. *molle*

Undersurface of leaves sometimes glandular beneath but without white scales, puberulous or glabrous ; venation equally prominent above and beneath ; lamina more or less elliptic or ovate-elliptic, or obovate-elliptic, obtuse at apex, 6–14 cm. long, 2·5–5 cm. broad ; fruits 1·8–2·5 cm. long ; leaves and fruits usually reddish-brown when mature and dry ; bark of bole and older branches pinkish-brown, finely reticulate :

Stem and mature leaves beneath densely and softly puberulous 8. *nigricans* var. *nigricans*

Stem and mature leaves beneath glabrous or nearly so—(see fig. 103 B) 8a. *nigricans* var. *elliotii*

Petals glabrous on the margin :

Upper receptacle (including calyx-lobes) 1 mm. long or less, very shallowly cup-shaped :

Plant with abundant red scales ; leaves and fruit drying reddish-brown ; for other characters see below .. .. 16. *micranthum*

Plant with white scales ; leaves drying greenish ; fruit pale brown ; for other characters see below .. .. 17. *nioroense*

Upper receptacle (including calyx-lobes) at least 2 mm. long, deeply cup-shaped or funnel-shaped ; fruit at least 2·5 cm. long :

Young shoots, inflorescences and fruits glutinous ; scales absent ; inflorescences usually on woody shoots and often branched ; bark of older branches grey, finely muricate, not peeling in stringy fibres :

Venation strongly reticulate and markedly prominent beneath ; upper surface of leaves smooth, puberulous, green and glutinous when fresh, midrib usually prominent above ; lower surface white when fresh, more or less densely tomentose ; lamina very thick and leathery, very variable in shape ; flowers densely hairy ; fruits about 3·5 cm. long, pale brown from the start 9. *glutinosum*

Venation conspicuous on both surfaces but not markedly prominent beneath ; both surfaces of similar colour when fresh ; lamina thinly coriaceous, glabrous or pubescent on both surfaces, very variable in shape ; flowers densely or sparsely hairy ; fruits up to 3·5 cm. long, red and very glutinous when young, becoming pale brown, glabrous .. .. 10. *ghasalense*

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[1] In some specimens of tetramerous *Combretum* occasional pentamerous flowers have been found, and occasional fruits with from 3 to 8 wings. In the same way the pentamerous species are sometimes found with a few abnormal flowers and fruits. The great majority of flowers and fruits on any one plant have, however, always been found to possess the correct number of parts, and this character may be taken as normally constant for the species.

Young shoots, inflorescences and fruits not glutinous ; scales mostly present (but see No. 15) ; inflorescences usually unbranched, axillary on young leafy shoots :

Flowers 5–6 mm. long (lower receptacle or " ovary," and upper receptacle including calyx-lobes, each about 3 mm. long) ; stem and leaves glabrous or very sparsely pubescent, undersurface of leaves densely covered with white scales ; leaves elliptic, ovate-elliptic, oblong-elliptic, or rarely broadly lanceolate, 6–14 cm. long, 3–6 cm. broad, petiole 1·5–3 cm. long :

Lower receptacle with reddish scales, almost without hair ; fruit deep crimson or purple, with red scales on the body ; bark of bole and older branches dark grey, fissured—(see fig. 103 D) .. .. .. 11. *binderianum*

Lower receptacle with whitish or brownish scales and with numerous hairs ; fruit brown, tomentose, without red scales .. .. 12. *crotonoides*

Flowers 3·5–4 mm. long (lower receptacle or " ovary," and upper receptacle including calyx-lobes, each about 2 mm. long) ; stem and leaves pubescent or tomentose at least when young ; bark of bole and older branches peeling in stringy fibres to expose reddish-brown powdery under-bark ; petiole 1–2 cm. long ; fruits tomentellous :

Undersurface of young leaves densely covered with white scales, densely puberulous on midrib, petiole and nerves, but only sparsely puberulous on the lamina ; mature leaves with scattered white scales beneath, and glabrous except for a few hairs on the midrib ; lamina ovate-elliptic to oblong-lanceolate, 8–14 cm. long, 4–6 cm. broad—(see fig. 103 C) 13. *lamprocarpum*

Undersurface of young leaves densely covered with white scales and with coarse, soft tomentum on both nerves and lamina ; mature leaves densely covered with white scales ; lamina elliptic to ovate-elliptic, 4–8 (–12) cm. long, 2–5 cm. broad.. .. .. 14. *geitonophyllum*

Undersurface of young leaves densely and closely tomentellous, brown when dry, with or without visible scales ; mature leaves tomentellous, scales usually becoming more obvious but never dense and almost contiguous as in Nos. 13 and 14 ; lamina elliptic to oblong-elliptic, 7–17 cm. long, 3·5–7·5 cm. broad .. .. 15. *hypopilinum*

Lianes and scandent shrubs, mainly in forest country (but see Nos. 16 and 17) :

‡Upper receptacle (including calyx-lobes) 1·5 mm. long or less :

Flower spikes up to 3 cm. long, dense, usually solitary in the leaf-axils ; mature leaves usually less than 6 cm. long (rarely up to 9 cm.), cuneate at base ; plants of savannah :

Inflorescence-axes, flowers, fruits, young shoots and petioles densely covered with red scales ; leaves drying reddish-brown ; fruits reddish-brown, up to 1·5 cm. long .. .. 16. *micranthum*

Inflorescence-axes and flowers with white scales ; stem, leaves and petiole more or less glandular ; plant without red scales ; leaves drying greenish ; fruits pale brown, up to 2 cm. (rarely to 3·5 cm.) long .. .. 17. *nioroense*

Flower spikes in branched panicles ; mature leaves usually more than 6 cm. long ; plants of forest vegetation :

Upper receptacle very shallowly cup-shaped, so that the disk is easily visible ; inflorescence-axes and/or flowers with scales :

Flower spikes up to 5 cm. long ; leaves glabrous and glandular beneath, with pits in the axils of the main nerves, lamina elliptic, coriaceous, 8–12 cm. long, 3·5–5·5 cm. broad, main lateral nerves prominently looped ; lower receptacle with abundant whitish scales .. .. 18. *obanense*

Flower spikes usually exceeding 5 cm. long :

Flowers viscid, glabrous, red scales sparse on inflorescence-axes only ; leaves glabrous, shining, with pits in the axils of the main nerves ; lamina broadly ovate, 10–16 cm. long, 6–9 cm. broad .. .. .. 19. *homalioides*

Flowers and inflorescence-axes with abundant red scales ; leaves pubescent on the midrib beneath and on petiole, without pits ; lamina oblong-elliptic, 8–16 cm. long, 4–8 cm. broad .. .. 20. *demeusei*

Upper receptacle deeply cup-shaped, concealing the disk ; inflorescence and flowers without scales :

Fruits 1–1·2 cm. long, very light and papery ; leaves pubescent beneath, neither glandular nor scaly, oblong or oblong-oblanceolate, 6–12 cm. long, 2·5–5 cm. broad, the upper ones gradually becoming smaller and bract-like ; inflorescence softly tomentellous, with very numerous flowers 21. *smeathmannii*

Fruits 2–4·5 cm. long ; leaves closely and minutely impressed-punctate and with white scales beneath :

Fruit orbicular, emarginate at apex, 2–3·5 cm. long, yellow-brown, with wide papery wings ; leaves chartaceous, drying pale brown or dull green, tertiary nerves almost at right angles to the main laterals ; lamina oblong-elliptic to ovate-elliptic, 10–21 cm. long, 5–10 cm. broad 22. *insulare*

Fruit ovate with a long beak, about 4·5 cm. long, dark brown, with thick narrow wings ; leaves coriaceous, drying dark brown, grey or black, tertiary nerves at an acute angle to the main laterals ; lamina broadly elliptic, 9–18 cm. long, 4·5–8 cm. broad .. .. 23. *cuspidatum*

‡Upper receptacle (including calyx-lobes) 2·5–6 mm. long :

Flowers and inflorescence-axes densely covered with reddish scales, otherwise glabrous ; upper receptacle (including calyx-lobes) 4–5 mm. long, attenuate to base, hence funnel-shaped ; flowers crowded in glomeruliform spikes ; leaves oblong to oblong-obovate, 8–17 cm. long, 3·5–7·5 cm. broad 24. *fulvum*

Flowers and inflorescence-axes without reddish scales, usually pubescent, sometimes with whitish scales :

Leaves with numerous minute reddish scales beneath ; upper receptacle (including calyx-lobes) 5–6 mm. long, funnel-shaped ; petals about 2·5 mm. long ; flowers in simple axillary spikes ; leaves oblong-ovate to ovate, 8–22 cm. long, 3·5–11 cm. broad .. .. 25. *bipindense*

Leaves without red scales ; petals 1–2 mm. long :

Upper receptacle attenuate to base, hence funnel-shaped, 4·5–5 mm. long ; flowers crowded in glomeruliform spikes ; leaves broadly ovate to ovate-elliptic, 10–17 cm. long, 7–10 cm. broad .. .. .. 26. *batesii*

Upper receptacle rounded at base, hence campanulate ; flowers in simple spikes or panicles of spikes :

Upper receptacle (including calyx-lobes) 3–5 mm. long, densely tomentose or tomentellous :

Margin of disk adnate ; upper receptacle (including calyx-lobes) 4–5 mm. long (see fig. 103E), shortly tomentose ; leaves coriaceous, mostly rounded at base ; main lateral nerves brown-bearded in axils, tertiary venation not conspicuous above ; lamina ovate-elliptic to oblong-elliptic, 11–19 cm. long, 5–8 cm. broad .. .. 27. *fuscum*

Margin of disk free for 1 mm. ; upper receptacle (including calyx-lobes) 3–4 mm. long, closely tomentellous ; leaves rigidly papery, mostly broadly cuneate at base ; main laterals not bearded in axils ; tertiary transverse venation close, subparallel, conspicuous above ; lamina oblong-elliptic, 9–16 cm. long, 3·5–6·5 cm. broad .. 28. *sordidum*

Upper receptacle (including calyx-lobes) about 2·5 mm. long, sparingly pubescent or glabrous ; margin of disk free for 1 mm. ; leaves elliptic to oblong-elliptic, 7–16 cm. long, 3–8 cm. broad .. .. 29. *oyemense*

†Petals and filaments red or crimson ; upper receptacle (including calyx-lobes) 3·5–8 mm. long ; flowers clustered in short glomeruliform or umbel-like spikes arranged in a large panicle :

Inflorescences with conspicuous white or pink bract-like leaves subtending the flower-clusters ; petals pilose outside, not incurved ; leaves elliptic to ovate, acute at apex, 5–10 cm. long, 3–5 cm. broad, pubescent on the nerves :

Upper receptacle glabrous .. .. 30. *racemosum*

Upper receptacle shortly pubescent .. .. 31. *cinereipetalum*

Inflorescences without white or pink bract-like leaves, flowers often produced before the leaves ; petals glabrous or sparsely pubescent outside, incurved :

Upper receptacle markedly swollen at base (see fig. 103 F), 5–8 mm. long, densely pilose ; leaves oblong-elliptic, rounded at base, emarginate and conspicuously mucronate at apex, 8–12 cm. long, 4–5 cm. broad, strongly reticulate and pubescent beneath .. .. 32. *lecardii*

Upper receptacle not, or scarcely, swollen at base, 3·5–5 mm. long, sparingly to densely pilose ; flowers in very large panicles ; leaves broadly elliptic, to nearly orbicular, 7–20 cm. long, 4–10 cm. broad, densely pubescent or nearly glabrous beneath .. .. 33. *paniculatum*

*Flowers 5-merous ; fruit 5-winged [1] ; scandent shrubs and lianes :

Stamens subsessile, together with the style, completely included in the campanulate 3·5–4·5 mm. long upper receptacle ; petals white ; fruit ovoid, woody, 5-angled but only very narrowly winged, 4–5·8 cm. long, 2·5–3 cm. broad ; leaves oblong-elliptic to narrowly elliptic, rounded or obtuse at apex, 4–13 cm. long, 2–6 cm. broad, very minutely impressed-punctate beneath .. .. 34. *acutum*

Stamens with filaments longer than the petals and, together with the style, well exserted from the receptacle :

Leaves up to 4·5 cm. long and 3 cm. broad ; flowers in short axillary racemes, scarcely as long as the leaves ; upper receptacle about 5 mm. long ; petals spathulate, well exserted, cream coloured ; lamina elliptic, petioles usually becoming spines ; scandent shrub in the drier savannah regions .. 35. *aculeatum*

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[1] See footnote on p. 266.

Leaves exceeding 5 cm. long and 3 cm. broad ; flowers in long spikes, or in panicles of spikes or of globose heads, or if in short racemes or clusters, then petals red :

Flowers in panicles of globose heads about 1 cm. diam. ; subtended by conspicuous whitish bract-like leaves ; petals and filaments cream ; fruits about 12 mm. long, apiculate ; leaves oblong-elliptic, 8–15 cm. long, 4–7 cm. broad ; softly pubescent beneath .. .. 36. *zenkeri*

Flowers not in panicles of globose heads about 1 cm. diam. ; usually in long spikes, but if in short racemes or clusters, then petals red :

øUpper receptacle straight, up to 15 mm. long, or if more then funnel-shaped and glabrous or sparsely pubescent outside ; disk without a free edge :

Flowers in short dense, terminal, simple racemes, 3–5 cm. long and broad ; upper receptacle funnel-shaped above, narrowly tubular in the middle, and swollen at the base (see fig. 103 I), 12–15 mm. long (including the broadly ovate calyx-lobes) ; petals scarlet ; leaves elliptic or obovate, 7–10 cm. long, 3–5 cm. broad .. .. 37. *constrictum*

Flowers in long spikes or spike-like racemes, often arranged in large panicles, or if in short dense clusters then upper receptacle campanulate and 5–7 mm. long :

Flowers in dense clusters, upper receptacle campanulate, 5–7 mm. long, petals deep scarlet ; leaves elliptic to obovate-elliptic, 7–14 cm. long, 3–7·5 cm. broad, glabrous .. .. 38. *confertum*

Flowers in long spikes or spike-like racemes ; often arranged in large panicles :

Upper receptacle rounded at base, hence campanulate, 3·5–5 mm. long (including the calyx-lobes) ; petals incurved, always red ; bracts mostly small ; leaves subcordate or rounded at base :

Stems with stiff dark-brown, spreading, gland-tipped hairs, about 2 mm. long ; flowers in long, lax, mostly simple, spike-like racemes ; leaves oblong, 7–13 cm. long, 2·5–5 cm. broad .. .. .. 39. *tarquense*

Stems shortly pilose or puberulous :

Flowers in long, lax, mostly simple, spike-like racemes, 10–15 cm. long ; leaves glabrous or sparsely pubescent beneath ; lamina obovate-oblong, 6–15 cm. long, 3–7 cm. broad ; petiole 5–8 mm. long 40. *calobotrys*

Flowers in spike-like racemes up to 10 cm. long, arranged in a branched panicle ; leaves hirsute on the nerves beneath ; lamina ovate-oblong, 8–13 cm. long, 4–7 cm. broad ; petiole 2–3 mm. long .. 41. *mannii*

Upper receptacle, attenuate at base, hence funnel-shaped, 5–22 mm. long ; petals, long exserted, not incurved ; bracts often large :

Upper receptacle (including calyx-lobes) 12–22 mm. long, glabrous or sparsely pubescent within and without (see fig. 103 H) ; petals spathulate, 10–15 mm. long, red ; leaves oblong, 8–15 cm. long, 4–9 cm. broad 42. *grandiflorum*

Upper receptacle (including calyx-lobes) 5–12 mm. long, pubescent, often densely so, within and without :

Bracts as long as, or longer than, the flowers and often hiding them, persistent ; petals lanceolate, 12–16 mm. long, usually yellow streaked with crimson ; inflorescence-axes and flowers with long spreading hairs (brown when dry) usually conspicuous amongst shorter hairs, not glandular ; fruits densely and softly hairy, usually very numerous ; leaves oblong-elliptic to oblong-obovate, up to 20 cm. long and 12 cm. broad—(see fig. 103 G) .. .. 43. *dolichopetalum*

Bracts seldom as long as the flowers and never hiding them, often early deciduous ; petals 6–12 mm. long, usually pink or red, with paler margins and outer surfaces ; inflorescence-axes and flowers without long spreading hairs, sometimes glandular :

Flowers densely crowded in the upper half of the spike-like racemes, peduncle and floriferous part each 2·5–5 cm. long ; racemes usually borne in whorls of 3 in the large panicles ; inflorescence and outside of flowers shortly pubescent, without long gland-tipped hairs ; upper receptacle (including the broadly triangular calyx-lobes) 5–7 mm. long, densely pilose within right up to the mouth ; petals red or crimson ; bracts usually persistent, coloured, with a broad blade ; leaves usually in threes, oblong-elliptic, 10–18 cm. long, 4·5–8 cm. broad 44. *comosum*

Flowers in larger spike-like racemes with the floriferous part up to 20 cm. long ; usually more laxly arranged racemes in opposite pairs, or alternate ; upper receptacle (including the long-triangular calyx-lobes) 7–9 mm. long, pilose within but only very sparsely so towards the mouth ; petals usually pink ; leaves in pairs ; bracts not strongly coloured :

Inflorescence and flowers without (or with only few) long gland-tipped hairs, but sometimes with short gland-tipped hairs ; flowers more or less crowded in the upper part of the raceme ; bracts often persistent 45. *rhodanthum*

Inflorescences and flowers with numerous long gland-tipped hairs ; flowers in long, lax, spike-like racemes ; bracts usually early caducous ; leaves oblong-elliptic, 10–25 cm. long, 5–11 cm. broad .. 46. *hispidum*

øUpper receptacle curved, 15–32 mm. long, tubular, rounded at base, densely puberulous, tomentose or velutinous ; disk with a free edge :

Stems and flowers without gland-tipped hairs ; upper receptacle 16–22 cm. long :

Flowers densely but shortly puberulous ; fruits orbicular, with wide, papery wings ; inflorescence usually well-branched ; leaves oblong-elliptic, rounded or cuneate at base, 9–15 cm. long, 3·5–6·5 cm. broad, glabrous 47. *platypterum*

Flowers very densely long-velutinous ; fruits fusiform, with thick, narrow wings ; inflorescence usually a simple spike ; leaves oblong-elliptic, cordate or subcordate at base, 6–13 cm. long, 3–6·5 cm. broad, pubescent on the midrib beneath .. .. 48. *mooreanum*

Stems and flowers densely covered with short gland-tipped hairs ; upper receptacle 30–32 mm. long ; inflorescence usually well-branched ; fruit orbicular, with wide, papery wings ; leaves ovate or ovate-oblong, subcordate at base, 10–15 cm. long, 6–8 cm. broad, glabrous—(see fig. 103 J) 49. *bracteatum*

1. **C. bauchiense** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 220 (1927) ; Kew Bull. 1928 : 224. *C. ghasalense* var. *pobeguinii* Aubrév. Fl. For. Soud.-Guin. 112 (1950). Stems to 3 ft. high ; petals, filaments and style cream ; probably closely related to trees of the *C. ghasalense* group.
Fr.Sud.: Guélia (Dec.) *Chev.* 320 *bis* ! **Fr.G.:** *Farmar* 286 ! Timbo (Jan.) *Pobéguin* 109 ! **N.Nig.:** Bauchi Plateau (Jan.) *Lely* P. 39 ! Vom *Dent Young* 92 ! Jos (Nov.) *Keay* FHI 21665 ! Ropp (Dec.) *Savory* UCI 131 ! Hoss *Keay* FHI 12725 !

2. **C. lineare** *Keay* in Kew Bull. 1953 : 290. *C. arenarium* Portères in Bull. Soc. Bot. Fr. 97 : 181, with fig. (1951), not of Engl. & Gilg (1903). Suffrutex, to 18 in. high ; petals yellow.
Fr.G.: Bouffa (fl. & fr. Mar.) *Portères.* Bramaya, Fouta Djalon *Paroisse* 178 !

3. **C. relictum** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 221 (1927) ; Kew Bull. 1928 : 225. *C. glutinosum* var. *relictum* (Hutch. & Dalz.) Aubrév. Combret. des Sav. Bois. A.O.F. 23 (1944) ; Fl. For. Soud.-Guin. 106, t. 15, 4. Suffrutex, to 3 ft. high ; calyx green, petals yellow.
Fr.G.: Fouta Djalon (fl. & fr. Mar.) *Heudelot* 747 ! *Aubrév.* 41–G ! Boké (June) *Paroisse* 12 !

4. **C. sericeum** *G. Don* in Edin. Phil. Journ. 11 : 347 (1824) ; Hook. Fl. Nigrit. 341 (1849) ; Keay in Kew Bull. 1950 : 255, 256. *C. herbaceum* G. Don l.c. ; F.T.A. 2 : 433 ; Engl. & Diels Monogr. Afr. Combretum 67 ; F.W.T.A., ed. 1, 1 : 220 ; Chev. Bot. 262. Suffrutex, with tough woody underground stem, sending up erect annual shoots, to 2 ft. high, after grass fires ; petals yellow, or pink, or red ; fruit pink, becoming pale brown.
Fr.Sud.: Guélia (Feb.) *Chev.* 319 ! **Fr.G.:** Kollangui (Apr.) *Chev.* 12884 ! Kouroussa (May) *Pobéguin* 894 ! **S.L.:** *Afzelius* ! *Don* ! Makunde (Apr.) *Sc. Elliot* 5710 ! Wallia, R. Scarcies (Feb.) *Sc. Elliot* 4283 ! Batkanu (Feb.) *Glanville* 166 ! **Iv.C.:** Baoule-Nord *Chev.* 22200. **G.C.:** Salaga *Krause* ! Navrongo (fl. & fr. May) *Andoh* FH 5215–7 ! Suguri (Apr.) *Pomeroy* 2 ! Gambaga (fl. & fr. May) *Vigne* 3852 ! **Dah.:** Atacora Mts. *Chev.* 23947. **N.Nig.:** Sokoto (Feb., Mar.) *Ryan* 4 ! 5 ! Zaria (Dec.) *Meikle* 829 ! Nupe *Barter* 793 ! 1682 ! Bauchi Plateau (fl. & fr. Jan.) *Lely* 9 ! P. 56 ! P. 60 ! Katagum *Dalz.* 359 ! **S.Nig.:** Old Oyo F.R. (fl. & fr. Feb.) *Keay* FHI 16282 ! 23444 ! Also in Ubangi-Shari and A.-E. Sudan. (See Appendix, p. 78.)
[Note that specimens have been collected which appear to be intermediate in habit between this species and *C. paniculatum* Vent., a scandent shrub or forest liane. The taxonomic status of such plants is as yet uncertain and further material and field studies are much required.]

5. **C. tomentosum** *G. Don*—F.T.A. 2 : 430 (excl. spec. *Kirk*) ; Engl. & Diels l.c. 16 ; Keay in Kew Bull. 1950 : 248. Scandent shrub with dense brownish indumentum ; flowers pale yellow.
Sen.: *Leprieur* ! Bondou (Feb., Mar.) *Heudelot* 375 ! Casamance *Etesse* 36 ! **Fr.Sud.:** Sicoro, Bamako (Jan., Mar.) *Chev.* 212 ! *Waterlot* 1503 ! 1504 ! Kita (Apr.) *Dubois* 13 ! **Port.G.:** Brene, Bissau (Jan.) *Esp. Santo* 1677 ! **Fr.G.:** Farana (fr. Mar.) *Sc. Elliot* 5364 ! Kouroussa (Feb.) *Pobéguin* 642 ! Timbo Kouria (Dec.) *Chev.* 14778 ! Pita (Jan.) *Jac.-Fel.* 739 ! **S.L.:** *Afzelius* ! Kukuna, Scarcies (Jan.) *Sc. Elliot* 4666 ! Madina, Tonko Limba (Mar.) *Adames* 221 !

6. **C. excelsum** *Keay* in Kew Bull. 1952 : 131. Forest liane ; calyx pale green ; petals pale yellow ; panicles up to 6 ft. long.
S.Nig.: Cross River North F.R. (Dec.) *Keay* FHI 28147 !

7. **C. molle** *R.Br. ex G. Don* in Trans. Linn. Soc. 15 : 431 (1827). *C. velutinum* DC. Prod. 3 : 20 (1828) ; Aubrév. Combret. des Sav. Bois. A.O.F. 32–34 (1944) ; Fl. For. Soud.-Guin. 116, t. 16, 9–13, incl. var. *glabrum* Aubrév. *C. trichanthum* Fres. in Mus. Senckenberg. 2 : 155 (1837) ; F.T.A. 2 : 431 ; Engl. & Diels l.c. 34. *C. sokodense* Engl. Bot. Jahrb. 39 : 498 (1907) ; F.W.T.A., ed. 1, 1 : 221. Savannah tree with relatively straight bole, to 30 ft. (rarely to 50 ft.) high, with characteristic dark grey deeply fissured bark ; petals and stamens cream.
Fr.Sud.: Kita *Dubois* 64. Nioro to Bamako *Aubrév.* 38–S. **Fr.G.:** Fouta Djalon *Heudelot* 691 ! Kouroussa *Pobéguin* 227. Kollangui *Chev.* 12878. **S.L.:** Bintumane Peak, 4,600 ft. (fr. Jan.) *T. S. Jones* 155 ! **Iv.C.:** various localities *fide* Aubrév. *l.c.* **G.C.:** Bawku (Apr.) *Vigne* 3751 ! Santejan to Nebiowalli (May) *Kitso* 526 ! Tainso, Wenchi (fr. Jan.) *Vigne* 3545 ! Nwerene (fr. May) *Irvine* 2459 ! **Togo:** Sokode (May) *Kersting* 86 ! Yendi (Apr.) *Williams* 169 ! **Dah.:** Atacora Mts. *Chev.* 24276 ! **Fr.Nig.:** Fada N'Gourma *fide* Aubrév. *l.c.* **N.Nig.:** Sokoto (Dec.) *Dalz.* 437 ! Zamfara F.R. (Apr.) *Keay* FHI 16140 ! 16148 ! 16185 ! Katagum *Dalz.* 347 ! Bauchi Plateau (Feb.) *Lely* P. 172 ! Yola (fl. Apr., fr. Oct.) *Dalz.* 92 ! **S.Nig.:** Lagos *Foster* 43 ! Olokemeji (fl. Mar., fr. Sept.) *A. F. Ross* 119 ! *Keay* FHI 25383 ! **Br.Cam.:** Bafut Ngemba F.R. (Apr.) *Ujor* FHI 30045 ! , Esu, Bamenda *Johnstone* 55/31 ! Widespread in tropical Africa. (See Appendix, p. 79.)

8. **C. nigricans** *Lepr. ex Guill. & Perr.* var. **nigricans**—F.T.A. 2 : 431 ; Engl. & Diels l.c. 19 ; Aubrév. Combret. des Sav. Bois. A.O.F. 30–32, partly ; Fl. For. Soud.-Guin. 114, partly (excl. syn. *C. lecananthum* Engl. & Diels). A small tree.
Sen.: Galam *Heudelot* 112 ! M'bidjem *Thierry* 224 ! **Gam.:** *Dawe* 48 ! Banks of R. Gambia *Leprieur* !

8a. **C. nigricans** var. **elliotii** (*Engl. & Diels*) *Aubrév.* Combret. des Sav. Bois. A.O.F. 30–32 (1944) ; Fl. For. Soud.-Guin. 115, t. 16, 5–8. *C. elliotii* Engl. & Diels l.c. 42 (1899) ; F.W.T.A., ed. 1, 1 : 220. *C. lecananthum* Engl. & Diels l.c. 42 (1899) ; F.W.T.A., ed. 1, 1 : 220. Savannah tree, 15–25 ft. high, rarely to 40 ft., with pinkish-brown finely reticulate bark ; petals and filaments cream, disk bright red ; mature fruits and dry leaves reddish-brown.

Sen.: *fide* Aubrév. *l.c.* **Fr.Sud.:** Koulikoro *Chev.* 2126! **Port.G.:** Botelhe, Caravela (May) *Esp. Santo* 2010! Banta, Buba (fr. May) *Esp. Santo* 2478! **Fr.G.:** Rio Nunez *Heudelot*! Mamou to Dalaba (Mar.) *Dalz.* 8369! Farana (fr. Jan.) *Sc. Elliot* 5363! *Chev.* 20452! **S.L.:** Berria, Falaba (Feb.) *Sc. Elliot* 4971! 4999! 5212! Erimakuna (fr. Mar.) *Sc. Elliot* 5251! Kambaia (fr. Oct.) *Small* 477! **Iv.C.:** various localities *fide* Aubrév. *l.c.* **G.C.:** Mangkurugu (fr. May) *Kitson* 528! Gbongoda, Gambaga (fr. June) *Akpabla* 697! Nchira, Wenchi (fr. Jan.) *Vigne* 3556! **Togo:** Basari (Apr.) *Kersting* A. 271! **N.Nig.:** Sokoto (fl. Apr., May, fr. Dec.) *Dalz.* 435! 539! *Ryan* 32! 61! Zamfara F.R. (fl. & fr. Apr.) *Keay* FHI 16173! 16176! 18062! Lokoja *Elliott* 230! **S.Nig.:** Olokemeji *Foster* 309! Also in Chad, Ubangi-Shari and A.-E. Sudan. (See Appendix, pp. 75, 77.)

9. **C. glutinosum** *Perr. ex DC.*—F.T.A. 2 : 432, partly ; Engl. & Diels l.c. 49 (excl. *Barter* 113) ; Aubrév. Combret. des Sav. Bois. A.O.F. 20–24 ; Fl. For. Soud.-Guin. 108, t. 15, 1–2, incl. var. *passargei* (Engl. & Diels) Aubrév. *C. passargei* Engl. & Diels l.c. 45 ; F.W.T.A., ed. 1, 1 : 221 (excl. *Dalz.* 426*b*). *C. leonense* Engl. & Diels l.c. 51 ; F.W.T.A., ed. 1, 1 : 222. *C. hypopilinum* of F.W.T.A., ed. 1, 1 : 221, partly (*Barter* 737 ; 1179 ; *Dalz.* 431–2 ; *Lely* 801). *C. ghasalense* of F.W.T.A., ed. 1, 1 : 221, partly (*Chev.* 190). Savannah tree, to 35 ft. high ; recognized in the field by the thick leaves which are green and glutinous above, but white, strongly reticulate and hairy beneath ; petals and filaments cream or yellow ; fruit pale brown.

Sen.: *Leprieur*! *Perrottet* 157! 312! Galam *Heudelot* 336! 376! **Gam.:** Sankuli Kunda (Jan.) *Dalz.* 8367! **Fr.Sud.:** Kati *Chev.* 190! **Fr.G.:** Tonba *Pobéguin* 2164. **S.L.:** Buyabuya, Scarcies R. (fr. Feb.) *Sc. Elliot* 4772! 4775! **Iv.C.:** Ouagadougou *Aubrév.* 2352. Kaya *Aubrév.* 2374. Bâtié *Aubrév.* 2840! **G.C.:** Navrongo (fl. & fr. Jan.–Mar.) *Vigne* 4477! 4482! 4659! 4724! Nangodi (fr. July) *Vigne* 3299! Tamale (fr. Apr.) *Darko* 277! Zuarangu (fr. Apr.) *Saunders* 2! **Dah.:** Atacora Mts. *Chev.* 24275! **Fr.Nig.:** Gourma *Chev.* 24408! **N.Nig.:** Sokoto (fl. Dec.–Feb.) *Dalz.* 431! 432! *Lely* 801! Kano (Jan.) *Dalz.* 331! Nupe *Barter* 737! 1179! Bauchi Plateau (fl. & fr. Mar.) *Lely* P. 180! P. 183! Musgu (fr. Apr.) *E. Vogel* 82! **S.Nig.:** Old Oyo F.R. (Feb.) *Keay* FHI 16013! Also in French Cameroons, Ubangi-Shari and A.-E. Sudan. (See Appendix, p. 76.)

10. **C. ghasalense** *Engl. & Diels* l.c. 47 (1899) ; Aubrév. Combret. des Sav. Bois. 25–26 ; Fl. For. Soud.-Guin. 112, t. 15, 5–7 (excl. var. *harmsianum* (Diels) Aubrév. and var. *pobeguinii* Aubrév.). *C. undulatum* Engl. & Diels l.c. 48. *C. zechii* Diels in Engl. Bot. Jahrb. 39 : 496 (1907). *C. chevalieri* Diels l.c. 497. *C. augustinum* Diels l.c. 501. *C. basarense* Engl. Bot. Jahrb. 39 : 496 (1907). *C. dalzielii* Hutch. in F.W.T.A., ed. 1, 1 : 222 (1927) ; Kew Bull. 1928 : 225. Savannah tree, to 25 ft. high ; petals and filaments cream or yellow ; young fruits red and very glutinous, becoming pale brown. At least *four* forms occur in our area, but they appear to be connected by intermediates and cannot be separated satisfactorily, even as varieties. They are : (A) leaves pubescent, broadly elliptic, broadest at or slightly above the middle, obtuse at apex, petiole relatively short, flowers densely hairy ; (B) leaves glabrous, broadly lanceolate, broadest below the middle, acute or acuminate at apex, margin markedly undulate, petiole relatively long ; flowers densely hairy ; (C) leaves as in B, but flowers sparsely pubescent ; (D) leaves as in A, but glabrous except for conspicuous tufts in the axils of the main lateral nerves, flowers sparsely pubescent.

Fr.Sud.: Yatenga *Chev.* 24803! Sikasso *Aubrév.* 10–S! **Fr.G.:** (fr. Feb.) *Farmar* 229! Guélia *Chev.* 320! Teliko *Pobéguin* 1443! Dalaba *Aubrév.* 9–G. **S.L.:** *Sc. Elliot* 4963! Kate *Sc. Elliot* 4966! Musaia *Deighton* 4193! Talla Hills (fr. Feb.) *Sc. Elliot* 4877! **Iv.C.:** various localities *fide* Aubrév. *l.c.* **G.C.:** Daboiya *Dudgeon* 102! Pong to Nakaw (Mar.) *Kitson* 697! Zuarungu (Feb.) *Vigne* 4725! Tainso, Wenchi (Jan.) *Vigne* 3544! Achimota (Jan.) *Irvine* 1945! Aframsu Kwahu (Jan.) *Chipp* 637! **Togo:** Kpedsu (Dec.) *Howes* 1051! Sokode (Jan.) *Kersting* A. 264! **N.Nig.:** Sokoto (Dec.) *Dalz.* 436! Kano to Zaria (Jan.) *Dalz.* 426*a*! 426*b*! Kontagora (Jan.) *Dalz.* 112! *Meikle* 1064! Lokoja *Dalz.* 911! Katagum (Dec.) *Dalz.* 221! *Elliott* 167! **S.Nig.:** Old Oyo F.R. (fl. & fr. Feb.) *Keay* FHI 14638! 14646! 16277! Also in French Cameroons, Ubangi-Shari and A.-E. Sudan. (See Appendix, pp. 75, 76.)

11. **C. binderianum** *Kotschy* in Sitzungsber. K. Akad. Wiss. Wien. math.-naturw. Cl. 51, 1 : 363, t. 5 (1865) ; Engl. & Diels l.c. 56 ; Aubrév. Fl. For. Soud.-Guin. 122. Savannah tree, 10–20 ft. high ; often on poor ironstone plateaux ; bark of bole and older branches dark grey and fissured ; petals and filaments cream ; fruit crimson or purple, with reddish scales.

G.C.: *Vigne*! Saku (Apr.) *Vigne* 4696! Mangkuma to Nakwabi, Bole *Kitson* 879! Adamsu, Ashanti (Dec.) *Vigne* 3501! **N.Nig.:** Anara F.R. (fr. May) *Keay* FHI 22956! Kankomi (fr. Aug.) *Keay* FHI 12689! Bauchi Plateau (Jan.) *Lely* P. 8! P. 11! P. 269! Lam Bau, Kwaya (fr. Aug.) *Daggash* FHI 24861! Also in French Cameroons, Ubangi-Shari and widespread in E. Africa.

12. **C. crotonoides** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 220 (1927) ; Kew Bull. 1928 : 224. *C. geitonophyllum* var. *crotonoides* (Hutch. & Dalz.) Aubrév. Combret. des Sav. Bois. A.O.F. 38 (1944) ; Fl. For. Soud.-Guin. 120, t. 17, 5–7. Savannah tree similar to above, but with brown tomentose fruits.

Sen.: Bondou *Heudelot* 187! 356! **Fr.Sud.:** *Bellamy* 450! Kita (fl. Feb.) *Dubois* 6*a*! Sebékoro (fr. Aug.) *Dubois* 6*c*! Nioro to Bamako (fr. Nov.) *Aubrév.* 18–S! 19–S! 20–S! **Fr.G.:** Kouroussa *Pobéguin* 647!

13. **C. lamprocarpum** *Diels* in Engl. Bot. Jahrb. 39 : 500 (1907) ; Aubrév. Combret. des Sav. Bois. A.O.F. 36 ; Fl. For. Soud.-Guin. 119. *C. kerstingii* Engl. & Diels in Engl. Bot. Jahrb. 39 : 499 (1907). *C. collinum* of F.W.T.A., ed. 1, 1 : 220, and of Aubrév. l.c. 119, not of Fres. *C. verticillatum* of F.W.T.A., ed. 1, 1 : 220, partly, not of Engl. Savannah tree, to 30 ft. high ; bark of bole and older branches peeling in stringy fibres and exposing the reddish-brown, powdery under bark ; petals and filaments cream.

Fr.Sud.: *fide* Aubrev. *l.c.* **Fr.G.:** Cita (Mar.) *Aubrév.* 23–G! Ditinn (Apr.) *Chev.* 12991! **Iv.C.:** Niangbo (Jan.) *Serv. For* 1705! Bondoukou (Jan.) *Aubrév.* 744! **G.C.:** Salaga (Jan.) *Vigne* 1545! Dukwesein, Ashanti (fr. Dec.) *Chipp* 607! Bosomoa F.R. (fr. June) *Vigne* 2998! **Togo:** *Busse* 3561! Loso (Mar.) *Kersting* 615! Yendi (Apr.) *Vigne* 1691! **Dah.:** Savé (May) *Chev.* 23561! 23580! **N.Nig.:** Nupe *Barter*! Kontagora (fl. & fr. Jan.) *Dalz.* 113! **S.Nig.:** Lagos *MacGregor* 138! Oyo to Iseyin road (Feb.) *Brenan & Keay* 8961! *Keay* FHI 22477! Old Oyo F.R. (fl. & fr. Feb.) *Keay* FHI 16270! (See Appendix, p. 77.)

14. **C. geitonophyllum** *Diels* in Engl. Bot. Jahrb. 39 : 495 (1907) ; Aubrév. Combret. des Sav. Bois. A.O.F. 38 ; Fl. For. Soud.-Guin. 120 (excl. var. *crotonoides* (Hutch. & Dalz.) Aubrév.). *C. verticillatum* of F.W.T.A., ed. 1, 1 : 220, partly, not of Engl. Savannah tree ; bark as in previous species.

Sen.: Haute Casamance *Etesse* 16! **Gam.:** N. bank of R. Gambia *Ozanne*! Sankuli Kunda (Jan.) *Dalz.* 8366! Kuntuar (fl. & fr. Jan.) *Dalz.* 8368! **Fr.Sud.:** N. Yatenya *Chev.* 24820! Macina *Chev.* 24914! Guétala *Dubois* 6*b*! Forgo, Mossi *Chev.* 24654! **Fr.G.:** Balanadougou (Feb.) *Chev.* 323!

15. **C. hypopilinum** *Diels* l.c. 497 (1907) ; Aubrév. Combret. des Sav. Bois. A.O.F. 39 ; Fl. For. Soud.-Guin. 121, t. 17, 8–10. *C. glutinosum* of F.T.A. partly, not of Perr. ex DC. Savannah tree or shrub, to 20 ft. high ; bark as in species No. 13 ; petals and filaments cream ; fruit purplish-brown.

Sen.: Bignona, Casamance *Aubrév.* 103–C. **Fr.G.:** Banko (June) *Pobéguin* 884! Dabola *Aubrév.* 25–G! **Iv.C.:** Ferkéssédougou (Apr.) *Aubrév.* 2320! 2321! Léo (fr. July) *Aubrév.* 2487! **G.C.:** Pan to Bujan (fl. & fr. Apr.) *Kitson* 523! Bele Dist. (May) *Kitson* 790! Lissa (Mar.) *Kitson* 812! Nangodi (fr. July) *Vigne* 3297! Gambaga (May) *Vigne* 3937! **Dah.:** Kandi (Jan.) *Aubrév.* 3–D! **Fr.Nig.:** Gaya *Aubrév.* 8–D! **N.Nig.:** Sokoto (Dec.) *Lely* 842! Nupe *Barter* 1113! 1192! 1204! Mokwa (Apr.) *Keay* FHI 25716! Musgu (May) *E. Vogel* 69! Bauchi *Shaw* 95! Abinsi (Feb., Mar.) *Dalz.* 698! 777! **S.Nig.:** Old Oyo F.R. (Feb.) *Keay* FHI 16288! 16300! Also in French Cameroons and Ubangi-Shari. (See Appendix, p. 76.)

16. **C. micranthum** *G. Don* in Edin. Phil. Journ. 11 : 347 (1824) ; Engl. & Diels Monogr. Afr. Combretum 17 ; Aubrév. Fl. For. Soud.-Guin. 114 ; Keay l.c. 250 (q.v. for full synonymy). *C. altum* Perr.—F.T.A. 2 ;

428. *C. floribundum* Engl. & Diels l.c. 18 ; Chev. Bot. 261. Spreading shrub, sometimes a liane, or a small tree ; petals white, receptacle with red scales ; leaves and fruits dark reddish-brown when old.
Sen.: *Sieber* 25 ! *Heudelot* 284 ! Thiès (fr. Dec.) *Chev.* 2147 ! **Gam.:** *Dawe* 83 ! Genieri (fr. Feb.) *Fox* 66 ! **Fr.Sud.:** Gourma (July) *Chev.* 24517 ! Fo *Chev.* 958 ! San (fr. Sept.) *Chev.* 2145 ! **Port.G.:** Pussubé (June) *Esp. Santo* 1185 ! Bissalanca, Bissau (fr. Jan.) *Esp. Santo* 1647 ! **Fr.G.:** Rio Nunez *Heudelot* 812 ! Diaguissa (Apr.) *Chev.* 12678 ! Ditinn (Apr.) *Chev.* 13559 ! **S.L.:** *Afzelius* ! Kukuna (fl. Mar., May, fr. Jan.) *Sc. Elliot* 4702*a* ! *Jordan* 388 ! *Adames* 220 ! **Iv.C.:** Bobo Dioulasso *Aubrév.* 1981 ! **G.C.:** *Williams* 521 ! Gambaga Scarp (July) *Akpabla* 728 ! **Dah.:** Kouandé to Konkobiri *Chev.* 24290 (partly) ! **Fr.Nig.:** Niamey to Zinder (fr. Oct.) *Hagerup* 568*a* ! **N.Nig.:** Nupe *Barter* 1645 ! 1711 ! Mokwa (fl. & fr. Apr.) *Keay* FHI 25718 ! Sokoto (May–July) *Dalz.* 429 ! *Lely* 821 ! 822 ! Katagum *Dalz.* 326 ! (See Appendix, p. 77.)

17. **C. nioroense** *Aubrév. ex Keay* in Kew Bull. 1953 : 290 ; Aubrév. Combret. des Sav. Bois. A.O.F. 27 (1944), French descr. only ; Fl. For. Soud.-Guin. 113, t. 15, 8. Scandent shrub.
Fr.Sud.: Nioro to Bamako (fr. Nov.) *Aubrév.* 30–S ! Bamako *Vuillet* 230 ! Koléna, Kita (fr. Sept.) *Dubois* 78 ! Gourma (July) *Chev.* 24404 ! Koulikoro (June) *Chev.* 25936 !

18. **C. obanense** (*Bak. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 221 (1927) ; Kew Bull. 1928 : 228 ; Exell in J. Bot. 67 : 101 (1929) ; Keay in Kew Bull. 1950 : 249. *C. paucinervium* Engl. & Diels var. *obanense* Bak. f. in Cat. Talb. 38 (1913). A forest shrub, with coriaceous leaves.
S.Nig.: Obutong Road, Oban *Talbot* 1676 ! Also in Gabon.

19. **C. homalioides** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 221 (1927) ; Kew Bull. 1928 : 225 ; Keay l.c. 249. Forest liane probably, but " tree 60 ft." *fide* Barter ; flowers white.
S.Nig.: Onitsha *Barter* 1803 ! Udi F.R. (Nov.) *Smith* 33 ! Also in Cabinda.

20. **C. demeusei** *De Wild.* in Ann. Mus. Congo 5, 3 : 235 (1910) ; Exell in J. Bot. 67 : 103 (1929) ; Keay l.c. 250. *C. mildbraedii* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 221 (1927) ; Kew Bull. 1928 : 225. Scandent shrub, with abundant red scales.
Fr.G.: Labé (fl. Jan., fr. Mar.) *Maclaud* 435 ! *Chev.* 12364 ! Mamou (Nov.) *Chev.* 141815 ! *Pobéguin* 1450 ! Diagoussa (Dec.) *Chev.* 18008 ! Dalaba (Dec., Mar.) *Chev.* 18091 ! 20293 ! Timbo (Nov.) *Chev.* 14792 ! **G.C.:** Essiama (fr. Feb.) *Irvine* 2317 ! **Togo:** Misahöhe (Nov.) *Mildbr.* 7305 ! Alavanyo, Hohoe (Nov.) *St. Clair Thompson* FH 3660 ! **S.Nig.:** Enugu F.R. (Oct.) *Smith* 23 ! Also in Ubangi, Gabon and Belgian Congo.

21. **C. smeathmannii** *G. Don* in Trans. Linn. Soc. 15 : 424 (1827) ; Exell in J. Bot. 67 : 139 (1929). *C. mucronatum* Schum. & Thonn. (1827) ; F.T.A. 2 : 426 ; Engl. & Diels l.c. 31 ; F.W.T.A., ed. 1, 1 : 221. Scandent shrub, becoming forest liane ; petals and filaments white ; fruits pale pink when young.
Gam.: *Pirie* 50 ! *Brown-Lester* 69 ! **Port.G.:** Bissau Dist. (Jan.-Feb.) *Esp. Santo* 1688 ! 1738 ! 1783 ! **Fr.G.:** *Heudelot* 744 ! Kouria (Jan.) *Pobéguin* ! Bilima (Dec.) *Chev.* 14885 ! **S.L.:** Kukuna, Scarcies R. (Jan.) *Sc. Elliot* 4702*b* ! Njala (fl. & fr. Feb.) *Deighton* 1814 ! 1929 ! Moyamba (Jan.) *Deighton* 3483 ! **Lib.:** Sardu (Jan.) *Bequaert* 56 ! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Aenyim, Obuasi (Jan.) *Chipp* 645 ! Nsawkaw, Wenchi (Jan.) *Vigne* 3540 ! Pokoase (fl. & fr. Mar.) *Irvine* 1532 ! **Togo:** Amedzofwe (Feb.) *Irvine* 177 ! **Dah.:** Porto Novo (fl. & fr. Jan.) *Chev.* 22829 ! 22843 ! **S.Nig.:** Lagos *Moloney* ! Abeokuta *Barter* 3319 ! Ibadan (fl. Dec., fr. Jan.) *Newberry* 4 ! 16 ! Oban *Talbot* 1386 ! Also in French Cameroons, Ubangi-Shari, Gabon, Spanish Guinea, Belgian Congo and Uganda. (See Appendix, p. 78.)

22. **C. insulare** *Engl. & Diels* Monogr. Afr. Combretum 21 (1899) ; Keay l.c. 252. Forest liane ; fruits yellowish.
S.Nig.: Ibadan North F.R. (fr. Feb.) *Chizea* FHI 23971 ! **Br.Cam.:** Victoria (fl. Nov., fr. Feb., Mar.) *Maitland* 380 ! 773 ! 1061 ! **F.Po:** *Mann* 1156 !

23. **C. cuspidatum** *Planch. ex Benth.*—F.T.A. 2 : 426 (excl. *Barter* 1803) ; Engl. & Diels l.c. 21 ; Keay l.c. 252 (*q.v.* for full synonymy). *C. afzelii* Engl. & Diels l.c. 22, not of G. Don ; F.W.T.A., ed. 1, 1 : 221. Large forest liane, especially by river banks ; flowers white, greenish-white or yellowish ; fruit bulky, probably dispersed by water.
Fr.G.: Rio Nunez *Heudelot* 630 ! **S.L.:** *Afzelius* ! *T. Vogel* 47 ! Senge (Nov.) *Deighton* 2369 ! Njala (fl. Nov., fr. Apr.) *Deighton* 3069 ! 3445 ! 3539 ! **Lib.:** Zeahtown, Tchien (Aug.) *Baldwin* 7015*a* ! **G.C.:** Tano R. (Sept.) *Chipp* 343 ! Princes (Jan.) *Akpabla* 786 ! Otrokpe (Sept.) *Vigne* 4006 ! **S.Nig.:** Iddo Isl., Lagos (Oct.) *Millen* 7 ! Eket *Talbot* ! **F.Po:** (June) *Mann* 410 ! Also in French Cameroons and Belgian Congo.

24. **C. fulvum** *Keay* in Kew Bull. 1950 : 254. Scandent shrub, or forest liane ; petals white, turning yellow.
Fr.G.: Séfan, Kindia (Dec.) *Jac.-Fel.* 2169 ! **S.L.:** Njala (Oct.) *Deighton* 1332 ! Taiya R., Mano (fr. Jan.) *Dalz.* 8097 !

25. **C. bipindense** *Engl. & Diels* Monogr. Afr. Combretum 77 (1899). Scandent shrub or forest liane ; flowers white ; easily recognized by the small red scales on the undersurface of the leaves.
G.C.: Kumasi (fl. Sept., fr. Dec.) *Vigne* 3369 ! 3369*a* ! Kwadaso (Oct.) *Darko* 737 ! **Br.Cam.:** FHI 12304 ! Victoria (fr. Feb.) *Maitland* 378 ! Also in French Cameroons.

26. **C. batesii** *Exell* in J. Bot. 67 : 145 (1929). *C. fuscum* of F.W.T.A., ed. 1, 1 : 221, partly (*Dunlap* 13). Forest liane.
Br.Cam.: Cam. Mt., 4,000 ft. (Jan.) *Dunlap* 13 ! Also in French Cameroons.

27. **C. fuscum** *Planch. ex Benth.*—F.T.A. 2 : 426 (excl. spec. *Irving*) ; Engl. & Diels l.c. 76. Scandent shrub or forest liane ; bract-like leaves white ; petals cream.
S.L. Freetown (June) *T. Vogel* 127 ! Between Bafodeya and Loko (Apr.) *Sc. Elliot* 5669 ! Bawbaw (May) *Deighton* 2692 ! Njala (June) *Deighton* 727 ! 1746 ! Yonibana (fr. Nov.) *Thomas* 5152 ! **Lib.:** Grand Bassa *Ansell* ! **Iv.C.:** Bouroukrou (fr. Jan.) *Chev.* 16739 ! **G.C.:** Assuansi (July) *Box* 2758 ! **S.Nig.:** Lagos *Millen* 156 ! Gambari F.R. (Aug.) *Onochie* FHI 19150 ! Awba Hills F.R. (fr. Jan.) *Jones & Keay* FHI 14625 ! Agulu (Aug.) *Latilo* FHI 27310 ! Also in Ubangi.

28. **C. sordidum** *Exell* in J. Bot. 67 : 144 (1929). Scandent shrub or forest liane ; bract-like leaves greenish-white ; petals cream.
G.C.: Nsuta (May) *Vigne* 1740 ! **S.Nig.:** Gambari Group F.R. (June–Aug.) *Onochie* FHI 19108 ! *Ejiofor* FHI 15144 ! Omo F.R. (fr. Feb.) *Jones & Onochie* FHI 17585 ! Okomu F.R. (fr. Jan.) *Brenan* 8861 ! Usonigbe F.R. (fr. Oct.) *Keay & Onochie* FHI 19671 ! Also in French Cameroons and Gabon.

29. **C. oyemense** *Exell* in Bull. Soc. Linn. Normandie, Sér. 8, 9 : 135 (1937). Scandent shrub ; petals and filaments white or yellow.
S.L.: Kambia Magbema (Mar.) *Jordan* 428 ! **G.C.:** Bura River F.R. (Mar.) *Andoh* FH 3264 ! Also in French Cameroons and Gabon.

30. **C. racemosum** *P. Beauv.*—F.T.A. 2 : 424 (incl. var. *flammeum* Welw. ex Laws.) ; Engl. & Diels l.c. 82 ; Chev. Bot. 264. Scandent shrub or forest liane ; bracteate leaves white with green veins, or rarely pink, petals and stamens vivid dark red.
Sen.: *Perrottet* ! **Gam.:** *Brown-Lester* 29 ! Genieri (Feb.) *Fox* 63 ! **Port.G.:** Pussubé (Dec.) *Esp. Santo* 1086 ! Brene, Bissau (Jan.) *Esp. Santo* 1680 ! **Fr.G.:** Rio Nunez *Heudelot* ! **S.L.:** *Don !* Njala (Feb.) *Deighton* 1066 ! Makeni (Jan.) *Deighton* 2854 ! **Lib.:** *Johnston* ! *Dinklage* 3319 ! Ganta (Dec.) *Barker* 1109 ! **G.C.:** Dodowa Plains (Jan.) *Johnson* 583 ! Anyinam (Dec.) *Dalz.* 100 ! Assuansi (Jan.) *Fishlock* 5 ! **Togo:** Makpame *Mildbr.* 7427 ! **Dah.:** Porto Novo (Jan.) *Chev.* 22830 ! **N.Nig.:** R. Gurara (Dec.) *Elliott* 201 ! R. Benue (Jan.) *Dalz.* 864 ! **S.Nig.:** Lagos *Foster* 144 ! Abeokuta (Jan.) *Rowland* ! Ibadan (Jan.) *Keay & Jones* FHI 14838 ! Oban *Talbot* ! Mt. Koloishe, Obudu (Dec.) *Keay & Savory* FHI 25128 ! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 2188 ! Victoria (Feb.) *Maitland* 413 ! Batibo, Bamenda (Jan.) *Keay* FHI 28328 ! **F.Po:** (Jan.) *Mann* 182 ! Also in French Cameroons, Ubangi, Kenya, Uganda, A.-E. Sudan, Gabon, Belgian Congo and Angola. (See Appendix, p. 78.)

31. **C. cinereipetalum** *Engl. & Diels* Monogr. Afr. Combretum 84 (1899). Scandent shrub or forest liane; very similar to the preceding species.
Br.Cam.: Buea (Dec., Jan.) *Maitland* 133! *Lehmbach* 136. Also in French Cameroons, Uganda, Belgian Congo and Angola.

32. **C. lecardii** *Engl. & Diels* l.c. 73 (1899); Chev. Bot. 263; Aubrév. Fl. For. Soud.-Guin. 106. Scandent shrub; flowers red.
Sen.: *Lecard* 12! Bondou *Heudelot* 151! **Gam.:** *Saunders* 56! *Pirie* 34! Georgetown (Jan.) *Dalz.* 8361! **Fr.Sud.:** Dio (Aug.) *Chev.* 167! Bamako (Jan., Mar.) *Chev.* 240! *Waterlot* 1050! **Fr.G.:** *Maclaud* 319! Coniagins (Feb.) *Pobéguin* 2139! **S.L.:** *Hutton*! (See Appendix, p. 77.)

33. **C. paniculatum** *Vent.*—F.T.A. 2: 425; Engl. & Diels l.c. 70; Chev. Bot. 263. *C. pincianum* Hook. Bot. Mag. sub. t. 4262 (1846). *C. ramosissimum* Engl. & Diels l.c. 72. *C. abbreviatum* Engl.—Engl. & Diels l.c. Scandent shrub, becoming lofty liane in forest, extending into the savannah regions in fringing forest and thickets; petioles becoming spines; petals and stamens bright red; flowers often produced when plant is leafless.
Sen.: *Perrottet*! **Gam.:** *Hayes* 527! **Fr.G.:** Timbo *Farmar* 272! Mamou (Mar.) *Dalz.* 8371! **S.L.:** *Don*! Njala (Jan., Feb.) *Deighton* 1930! 1930*a*! Sherbro *Sc. Elliot* 5847! Karina (Jan.) *Glanville* 144! **Lib.:** Brewersville (Dec.) *Baldwin* 10977! **Iv.C.:** *fide* Chev. *l.c.* **G.C.:** Tamale *Williams* 422! Nsawkaw, Wenchi (Jan.) *Vigne* 3539! Aburi *Patterson*! R. Volta, Krepi (Jan.) *Johnson* 566! **Dah.:** *Burton*! Porto Novo (Jan.) *Chev.* 22825! **N.Nig.:** Sokoto (Feb.) *Lely* 808! Nupe (Apr.) *Barter* 735! Yola (Feb.) *Dalz.* 196! Gidan Atiko, Tiv (Dec.) *Keay* FHI 22710! **S.Nig.:** Epe (Feb.) *Millen* 154! Ibadan (Dec.–Feb.) *Keay* FHI 14606! 25672! Ilora, Oyo (Jan.) *Keay* FHI 25644! Oban *Talbot* 1478! **Br.Cam.:** Buea (Dec.) *Maitland* 887! Kate, Kumba (Feb.) *Dundas* FHI 13990! **F.Po:** *Barter* 2061! (Jan.) *Mann* 203! Widespread in tropical Africa. (See Appendix, p. 78.)
[See note under No. 4, *C. sericeum* G. Don.]

34. **C. acutum** *Laws.* in F.T.A. 2: 424 (1871); Keay in Kew Bull. 1950: 247; Hook. Ic. Pl. t. 3476 (1950). Scandent shrub, to 10 ft. high; by river banks in savannah regions; young branches purplish; petals white.
G.C.: R. Addeko (Apr.) *Kitson* 931! Bugiyenga to Loggada (May) *Kitson* 530! Pong Tamale (fl. & fr. May) *Vigne* 3862! R. Volta, Naga (Mar.) *Vigne* 4689! **Dah.:** Sansanné Mange, Oti (Feb.) *Aubrév.* 133–D! **N.Nig.:** Lokoja *Barter* 453! 1671! Abinsi (June) *Dalz.* 706!

35. **C. aculeatum** *Vent.*—F.T.A. 2: 423; Chev. Bot. 260; Aubrév. Fl. For. Soud.-Guin. 106. Scandent shrub of dry regions; petals white.
Sen.: *Heudelot* 424! *Leprieur*! *Sieber* 55! Dakar (Apr.) *Hagerup* 11! **Fr.Sud.:** Kodjar, Gourma (July) *Chev.* 24385! **Iv.C.:** Yako *Aubrév.* 2750. Ouagadougou *Aubrév.* 2439. **G.C.:** Busunu (May) *Vigne* 3845! 3870! **Fr.Nig.:** Niamey *Aubrév.* 40–N! **N.Nig.:** Sokoto (fr. July) *Dalz.* 430! Mutwe (fr. Dec.) *Foster* 74! Bornu (Apr.) *E. Vogel* 81! Yola (Dec.) *Dalz.* 93! Also in Mauritania, and extends to Abyssinia, Somaliland and Tanganyika. (See Appendix, p. 75.)

36. **C. zenkeri** *Engl. & Diels* l.c. 66 (1899). Scandent shrub or forest liane, bracteate leaves white; petals cream.
Fr.G.: Nzérékoré (Oct.) *Jac.-Fel.* 2037! *Baldwin* 9706! **Iv.C.:** Baoulé (Oct.) *Pobéguin* 196! **G.C.:** Kumasi (Sept., Oct.) *Vigne* 1338! *Darko* 731! Nsawam (Oct.) *Dalz.* 98! Bomkrom, Afram Plains (fr. Jan.) *Chipp* 597! **Togo:** Lome *Warnecke* 449! Hohoe Dist. (Oct.) *St. Clair Thompson* FH 3596! **Dah.:** *Poisson*! Croja Quéré (Sept.) *Le Testu* 290! **S.Nig.:** Lagos *Millen* 52! Abeokuta *Irving* 18! Olokemeji *Foster* 130! Ibadan (fl. Sept.–Oct., fr. Oct.–Dec.) *Jones & Keay* FHI 13713! Oban *Talbot* 1373! Also in French Cameroons. (See Appendix, p. 79.)

37. **C. constrictum** (*Benth.*) *Laws.* in F.T.A. 2: 423 (1871), partly (spec. *Vogel* only). *Poivrea constricta* Benth. in Fl. Nigrit. 337 (1849). Usually a low shrub, erect or scrambling; leaves alternate, or often opposite, or sometimes in whorls of 3; flowers crowded, scarlet, often at the ends of short branches near the ground; often in damp situations.
N.Nig.: Gurara R. (fr. July) *Elliott* 183! Gbebe, Bassa (June) *Elliott* 241! Abinsi (Mar.) *Dalz.* 705! 787! Yola *Dalz.* 191! **S.Nig.:** Onitsha *Barter* 1303! Idah (Sept.) *T. Vogel* 39! Ibo country (Aug.) *T. Vogel* 42! Idua, Calabar R. (Sept.) *Holland* 155! Ahoada (Aug.) *Talbot* 3805! Also in Tanganyika. (See Appendix, p. 75.)

38. **C. confertum** (*Benth.*) *Laws.* in F.T.A. 2: 422 (1871); Engl. & Diels l.c. 74. *Poivrea conferta* Benth. in Fl. Nigrit. 338 (1849). Forest liane; petals, stamens and style deep scarlet.
S.Nig.: Oban *Talbot*! Oron to Eket *Talbot*! Bendiga Ayuk, Ikom (Dec.) *Keay* FHI 28170! **Br.Cam.:** Johann-Albrechtshöhe (Oct.) *Staudt* 774. **F.Po:** (Dec.) *T. Vogel* 256! Also in French and Belgian Congo.

39. **C. tarquense** *J. J. Clark* in Kew Bull. 1913: 76 (1913). Scandent shrub; stems with stiff brown hairs; petals red; fruit crimson.
Iv.C.: Aboisso, Sanvi (Apr.) *Chev.* 17749! **G.C.:** Tarkwa (Feb.) *Thompson* 43! Suku Suku (Nov.) *Chipp* 10! Bou (Nov.) *Vigne* 1413! Prestea (Sept.) *Vigne* 3069! Axim (Feb.) *Irvine* 2202! Benso (Jan.) *Andoh* FH 5384!

40. **C. calobotrys** *Engl. & Diels* l.c. 73 (1899). Scandent shrub or liane, with long simple racemes of flowers with scarlet petals and stamens.
Lib.: Grand Bassa (Nov.) *Dinklage* 1775! 1862! Kakatown *Whyte*! Dukwia R. (Oct., Nov.) *Cooper* 49! Farmington R. (Dec.) *Bequaert* 7!

41. **C. mannii** *Laws. ex Engl. & Diels* l.c. 74 (1899). *C. klotzschii* of F.T.A. 2: 422, partly. Forest liane; flowers red or purple.
Dah.: *Le Testu* 191! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 725! Also in Gabon.

42. **C. grandiflorum** *G. Don*—F.T.A. 2: 423; Engl. & Diels l.c. 89; Chev. Bot. 262. Scandent shrub or forest liane; petals brilliant red.
Gam.: Abuko (Jan.) *Dalz.* 8362! **Port.G.:** Bubaque, Bijagós (Nov.) *Esp. Santo* 2330! **Fr.G.:** Conakry (Jan., Feb.) *Dalz.* 8363! *Chev.* 12075! **S.L.:** *Don*! *Barter*! *Sc. Elliot* 4081! Sukudu *Dawe* 550! Giewahun (Nov.) *Deighton* 181! Kuntaia (June) *Thomas* 429! **Lib.:** Monrovia (Oct.) *T. Vogel*! *Cooper* 54! Gbanga (Sept.) *Linder* 556! Gletown, Tchien (July) *Baldwin* 6943! **Iv.C.:** San Pedro *Thoiré* 319! Yapo (Oct.) *Chev.* 22367*b*! Dabou *Chev.* 15237! **G.C.:** Tarkwa (July, Sept.) *Dalz.* 99! *Vigne* 142! 4764! Benso (Aug., Nov.) *Andoh* FH 5392! Prestea (July) *Vigne* 1262! 3071! (See Appendix, p. 76.)

43. **C. dolichopetalum** *Engl. & Diels* l.c. 91 (1899). *Cacoucia villosa* Laws. in F.T.A. 2: 433. *Combretum lawsonianum* of Chev. Bot. 263, not of Engl. & Diels. Scandent shrub or forest liane; flowers often hidden by the large yellow-green bracts; petals yellow with crimson streaks within.
S.L.: Tiama, Njala (Jan.) *Dalz.* 8356! *Deighton* 503! **Iv.C.:** Grand Bassam (Jan.) *Pobéguin* 200! San Pedro (Sept.) *Thoiré*! Abidjan (Dec.) *Chev.* 17324! **G.C.:** Tano R. (fl. & fr. Sept.) *Chipp* 344! Dunkwa (fl. & fr. Aug.) *Vigne* 159! Axim (Feb.) *Irvine* 2160! Kumasi (fl. & fr. Sept.) *Darko* 338! **Dah.:** Porto Novo (Jan.) *Chev.* 22820! **S.Nig.:** Lagos *Rowland*! *Millen* 64! 182! Ibadan (fl. & fr. Jan.) *Keay & Jones* FHI 14837! Awka *Thomas* 73! Oban *Talbot* 1333! Eket *Talbot* 3004! Calabar (fl. & fr. Feb.) *Mann* 2296! **Br.Cam.:** Mamfe (Dec.) *Keay* FHI 28321! Rio del Rey *Johnston*! (See Appendix, p. 75.)

44. **C. comosum** *G. Don*—F.T.A. 2: 421; Engl. & Diels l.c. 91; Chev. Bot. 261. *Poivrea comosa* (G. Don) Walp.—Fl. Nigrit. 339. Scandent shrub, or forest liane, with large panicles; petals red or crimson.
Gam.: Albreda *Perrottet*. **Fr.G.:** Fouta Djalon *Heudelot* 834! Conakry *Maclaud*! Irebeleya (Dec.) *Chev.* 14762! **S.L.:** *Don*! Freetown (Jan.-May) *Barter*! *Johnston* 49! Njala (Feb.) *Deighton* 497!

Pujehun (Feb.) *Dawe* 471! **Lib.:** Kakatown *Whyte*! Bushrod Isl. (Dec.) *Barker* 1105! Boporo (Nov.) *Baldwin* 10374! **G.C.:** *Burton*! Tarkwa (Dec., Jan.) *Johnson* 982! *Vigne* 4117! Tuapem (Nov.) *Chipp*! (See Appendix, p. 75.)

45. **C. rhodanthum** *Engl. & Diels* Monogr. Afr. Combretum 92 (1899). *C. comosum* of F.W.T.A., ed. 1, 1 : 222, partly, not of G. Don. Scandent shrub, or forest liane ; petals pink.
Fr.G.: Koukouré Valley *Pobéguin*! **S.L.:** near Mofari, Scarcies (Jan.) *Sc. Elliot* 4438! 4443! Kenema (Feb.) *Lane-Poole* 348! Segbwema *Smythe* 50! Yokodu (Feb.) *MacDonald* 9! Kamakui (fl. & fr. Aug.) *Deighton* 3500! 3498! **Lib.:** Gbanga (Dec.) *Baldwin* 10526! *Daniel* 37! Also in Ubangi-Shari, Uganda, A.-E. Sudan and Belgian Congo.

46. **C. hispidum** *Laws.* in F.T.A. 2 : 421 (1871) ; Engl. & Diels l.c. 89. Scandent shrub or liane ; inflorescence, flowers and fruits sticky with numerous gland-tipped hairs ; petals bright salmon-pink within, paler at margins and without, deflected to one side.
Fr.G.: Soriba *Pobéguin*! Kouria (Jan.) *Pobéguin* 894! *Chev.* 18170! Timbo *Pobéguin* 99! 142! Dalaba (Mar.) *Dalz.* 8372! **S.L.:** Kalangba (Feb.) *Glanville* 178! Musaia (Feb.) *Deighton* 4227! Fondokhori (Feb.) *Deighton* 5317! **Lib.:** Vonjama (Feb.) *Bequaert* 87! **G.C.:** Ofuman, Wenchi (fl. & fr. Jan.) *Vigne* 3552! Sunjani (Feb.) *Darko* 379! **Togo:** Misahöhe (Feb.) *Baumann* 379. **S.Nig.:** Ibadan (fl. & fr. Jan.) *Keay* FHI 14595! 14839! Olokemeji (fl. & fr. Mar.) *Meikle* 1302! Ubulubu (Feb.) *Thomas* 2302! 2314! Also in Ubangi-Shari, French Cameroons, Spanish Guinea, Belgian Congo and Angola.

47. **C. platypterum** (*Welw.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 220 (1927) ; Kew Bull. 1928 : 224. *Cacoucia platyptera* Welw. in Trans. Linn. Soc. 27 : 24 (1869). *Campylochiton platypterus* Hiern in Cat. Welw. 2 : 354. *Cacoucia paniculata* Laws. in F.T.A. 2 : 434. *Cacoucia barteri* Hemsl. in Kew Bull. 1897 : 267. *Combretum lawsonianum* Engl. & Diels l.c. 101. Scandent shrub or forest liane ; bracts and receptacle greyish-red or red ; petals yellow to red ; filaments red ; fruits red at first then pale brown.
Fr.G.: Conakry (fr. May) *Baldwin* 5790! **S.L.:** R. Scarcies, Kambia (Jan.) *Sc. Elliot* 4710! Panguma *Smythe* 73! Kamakwie (Feb.) *Deighton* 4200! Sukudu (fl. & fr. July–Aug.) *Dawe* 544! **Lib.:** Nyandamolahun (Feb.) *Bequaert* 72! Ganta (fl. & fr. May) *Harley* 1194! **G.C.:** Abofaw, Ashanti (June) *Vigne* 1190! Akwapim (Apr.) *Gould*! **S.Nig.:** Lagos *Rowland*! Ibadan (fl. Apr., fr. Aug.) *Meikle* 1447! *Keay* FHI 16233! Onitsha *Barter* 1657! *Unwin* 62! Ogoja *Rosevear* 54/29! **Br.Cam.:** Bamenda (Apr., June) *Maitland* 1405! 1579! Extends to Angola, Belgian Congo and Upper Nile land. (See Appendix, p. 78.)

48. **C. mooreanum** *Exell* in J. Bot. 67 : 179 (1929). *Cacoucia velutina* S. Moore in J. Bot. 18 : 2 (1880). *Combretum velutinum* (S. Moore) Engl. & Diels l.c. 100 (1899), not of DC. (1828) ; F.W.T.A., ed. 1, 1 : 220. *Cacoucia coccinea* of F.T.A. 2 : 434, not of Aubl. Straggling shrub to 7 ft. high, in marshes ; flowers red or dull orange-red.
S.L.: R. Bagroo (Apr.) *Mann* 856! Newton (fl. & fr. Feb.) *Jordan* 195! Gbangbatok to Moselelo (Nov.) *Deighton* 2380! Gegbwema (fr. Apr.) *Deighton* 3725! Giema (Nov.) *Deighton* 355! Kumrabai (fl. & fr. Dec.) *Thomas* 6734! Magburuka, Rowala (Jan.) *King* 150*b*! (See Appendix, p. 78.)

49. **C. bracteatum** (*Laws.*) *Engl. & Diels* l.c. 100, t. 29 B (1899), excl. syn. *Cacoucia platyptera* Welw. and *Campylochiton platypterus* Hiern. *Cacoucia bracteata* Laws. in F.T.A. 2 : 434, partly (excl. spec. *Welw.*). *Cacoucia platyptera* of Hemsl. in Hook. Ic. Pl. t. 2549, not of Welw. *Cacoucia splendens* Hemsl. l.c. t. 2548. Scandent shrub ; bracts yellowish-green to reddish-yellow ; receptacle and calyx-lobes yellow on one side, orange on the other ; petals and filaments orange, anthers red.
S.Nig.: Oban *Talbot*! Calabar (Jan.) *Holland* 12! Itang, Calabar (fl. & fr. Jan.) *Box* 3544! **Br.Cam.:** Victoria (fl. Nov.–Feb., fr. Mar.) *Preuss* 1320! *Maitland* 146! 473! Cameroons R. (Jan.) *Mann* 2208! Johann-Albrechtshöhe (Jan.) *Staudt* 527! Mamfe (Jan.) *Keay* FHI 28324! **F.Po:** (Jan., Feb.) *Barter* 2057! *Mann* 158! *Kalbreyer* 42! Also in French Cameroons, Gabon and Cabinda. (See Appendix, p. 75.)

Imperfectly known species.

1. **C. fruticosum** (*Loefl.*) *Stuntz* in U.S. Dept. of Agric. Bur. Pl. Ind. Invent. Seeds & Pl. Import 31 : 86 (1914) ; Exell in J. Bot. 67 ; 143 (1929). A specimen in the Paris Herbarium (*Heudelot* 45) purporting to be from Senegal is this S. American species. It seems however that labels have become confused as there is no sheet of this species bearing Heudelot's own label and the species is not otherwise recorded from Africa.

2. **C. macrocarpum** *P. Beauv.* Fl. Oware 90, t. 118, fig. 2. Described only from detached fruits ; referred by most authors to *C. racemosum* P. Beauv., but probably not a *Combretum* at all.

3. **C. etessei** *Aubrév.* Combret. des Sav. Bois. A.O.F. 19 (1944), French descr. only ; Fl. For. Soud.-Guin. 108. Savannah tree ; flowers not known ; evidently related to *C. glutinosum* Perr. ex DC.
Sen.: Fouladou *Etesse* 42! Bignona *Aubrév.* 59! **Port.G.:** Xime to Bambadinca (fr. June) *Esp. Santo* 2271!

4. **C. maclaudii** *Aubrév.* Combret. des Sav. Bois. A.O.F. 40 (1944), French descr. only ; Fl. For. Soud.-Guin. 122. Savannah tree ; fruits not known.
Fr.G.: boundary of Portuguese Guinea *Maclaud*!

5. **C. simulans** *Portères* in Bull. Soc. Bot. Fr. 97 : 179 with fig. (1951). Suffrutex ; probably a form of *C. sericeum* G. Don ; type specimen not traced.
Fr.G.: Mali, Fouta Djalon (Nov.) *Portères*.

6. **C. dolichopodum** *Gilg ex Engl.* in Pflanzenw. Afr. 3, 2 : 700 (1921) ; Exell in J. Bot. 67 : 140 (1929). Type from French Cameroons ; also recorded from Togoland, but specimens not traced.

7. **C.** sp. **A.** Flowers in bud only ; evidently distinct from all other species in our area.
S.Nig.: Oban *Talbot* 500!

8. **C.** sp. **B.** Habit not known ; fruits not known.
S.L.: Yonibana (Nov.) *Thomas* 4164! 4248! 4657! 4785! 5260! Mamoka *Thomas* 4360!

3. PTELEOPSIS Engl.—Engl. & Diels Monogr. Afr. Combretac. 2 (1900).

Fruits 3- or 4-winged ; trees or shrubs of savannah :

Leaves 4–11 cm. long, 2–4 cm. broad, lamina ovate-elliptic, or oblong-elliptic, or narrowly oblong, narrowed at base, acuminate, thinly pilose beneath ; lateral nerves 6–8 pairs ; petiole 5–15 mm. long ; fruits 3- or 4-winged, broadly obovate, 1·6–2 cm. long, 1·5–2·5 cm. broad, borne on slender pedicels about 1 cm. long ; a small tree .. .. 1. *suberosa*

Leaves up to 3 cm. long and 1·5 cm. broad, lamina ovate, obtuse or rounded at base, obtuse or very obtusely acuminate at apex, glabrous or slightly pubescent ; petiole short ; fruits 3-winged, about 1 cm. long and 0·7 cm. broad, borne on very slender pedicels 7–9 mm. long ; low straggling shrub .. .. .. 2. *habeensis*

Fruits 2-winged ; a tree of rain forest ; leaves appearing after the flowers, opposite or subopposite, with appressed silky hairs when young, glabrescent, but still slightly pilose even when adult ; lamina broadly oblong to obovate-oblong, rarely broadly lanceolate, obtuse or acute at base, acuminate at apex, 5–8 cm. long, 2–3·5 cm. broad ; lateral nerves 10–12 pairs ; petiole 10–15 mm. long ; flowers in 1–2 cm. long, capituliform, many-flowered, corymbose-racemes ; fruits broadly elliptic, 1·5–1·7 cm. long, 1–1·2 cm. broad .. .. 3. *hylodendron*

1. **P. suberosa** *Engl. & Diels* in Engl. Bot. Jahrb. 39 : 509 (1907) ; Chev. Bot. 265 ; Aubrév. Fl. For. Soud.-Guin. 139, t. 21, 1–2. Savannah tree, to 30 ft. high.
Fr.Sud.: Balani (fr. Jan.) *Chev.* 143. Kolokeni (Nov.) *Aubrév.* 65–S ! Bougouni to Sikasso (Nov.) *Aubrév.* 66–S ! **Fr.G.:** Dara (fl. & fr. Feb.) *Maclaud* 93 ! Kinsam *Maclaud* 215 ! Siguiri (Nov.) *Jac.-Fel.* 1391 ! 1392 ! **Iv.C.:** Bobo Dioulasso (fl. Nov., fr. Dec.) *Aubrév.* 1842 ! 2166 ! 2224 ! Po (Nov.) *Aubrév.* 2169 ! **G.C.:** Naga (fr. Mar.) *Vigne* ! Nakong (fr. Feb.) *Vigne* 4719 ! **Togo:** Sokodé-Basari (Nov.) *Kersting* 486 ; A. 315 ! **Dah.:** Kandi (fr. Jan.) *Aubrév.* 7–D ! **Fr.Nig.:** Gaya, Air (Oct.) *Aubrév.* 15–N ! **S.Nig.:** Old Oyo F.R. (fr. Feb.) *Keay* FHI 14649 ! 14650 ! Upper Ogun F.R. (fr. Feb.) *Keay* FHI 22507 !

2. **P. habeensis** *Aubrév. ex Keay* in Kew Bull. 1953 : 290 ; Aubrév. Fl. For. Soud.-Guin. 141, t. 21, 3 (1950), French descr. only ; Aubrév. Fl. For. C. Iv. 3 : 61 (1936), name only. Shrub with habit of *Combretum micranthum* with which it is found in low thickets.
Fr.Sud.: Bandiagara (fr. Sept.) *Aubrév.* 1776 ! Bandiagara to Mopti *Chev.* 24914 ! Ségou *Vuillet.*

3. **P. hylodendron** *Mildbr.* in Notizbl. Bot. Gart. Berl. 8 : 61 (1921) ; Aubrév. Fl. For. C. Iv. 3 : 61, t. 264, 1–4. *P. suberosa* of F.W.T.A., ed. 1, 1 : 222, partly (Gold Coast specimens), not of Engl. & Diels. Rain forest tree, to 12 ft. girth, without buttresses, flowers white.
Iv.C.: Danané *Aubrév.* 1117 ! Banco (Jan.) *Aubrév.* 1774 ! 1775 ! **G.C.:** Wiawosa, W. Ashanti (Feb.) *Chipp* 104 ! Owabi, Ashanti (Feb.) *Andoh* FH 4293 ! Dunkwa (Mar.) *Vigne* 987 ! Kumasi (Feb.) *Vigne* 1814 ! **S.Nig.:** Ukpon F.R. (fl. Feb., fr. Mar.) *Catterall* 2 ! Also in French Cameroons.

Imperfectly known species.

P. kerstingii *Gilg ex Engl.* Pflanzenw. Afr. 3, 2 : 717 (1921). In savannah and gallery-forest.
Togo: Sokodé *Kersting.*

4. **QUISQUALIS** Linn.—F.T.A. 2 : 435 ; Exell in J. Bot. 69 : 117 (1931).

Upper receptacle up to 2 cm. long ; petals 3–4 mm. long, inconspicuous :

Upper receptacle 8–10 mm. long, pubescent ; leaves oblong, rounded or rarely subcordate at base, obtuse at apex, 7–12 cm. long, 3–5 cm. broad, with 4–6 main lateral nerves on each side of the midrib ; fruit broadly elliptic, with wide wings about 3 cm. long and 2–2·5 cm. broad .. .. 1. *latialata*

Upper receptacle about 2 cm. long, purple, velutinous ; leaves ovate-oblong to ovate-lanceolate, obtuse to subcordate at base, acuminate, 5–8 cm. long, 2–3 cm. broad, with 7–8 main lateral nerves on each side of the midrib ; fruit oblong, winged, about 3 cm. long and 2 cm. broad .. .. 2. *pellegriniana*

Upper receptacle 4–8 cm. long, glabrous or shortly pubescent ; petals about 15 mm. long, conspicuous ; leaves obovate-elliptic, rounded at base, shortly acuminate, 3·5–14 cm. long, 2·5–8 cm. broad : fruits narrowly elliptic, with narrow, thick wings, about 3 cm. long .. .. 3. *indica*

1. **Q. latialata** (*Engl. ex Engl. & Diels*) *Exell* in J. Bot. 69 : 121 (1931). *Combretum latialatum* Engl. ex Engl. & Diels Monogr. Afr. Combretum 86, t. 25C (1899) ; F.W.T.A., ed. 1, 1 : 221. Scandent shrub, with pale bract-like leaves ; petals red or purplish.
S.Nig.: Brass *Barter* 288 ! Sapoba *Kennedy* 347 ! 2627 ! Degema *Talbot* ! **Br.Cam.:** Victoria (June) *Maitland* 57 ! Victoria to Bimbia (Aug.) *Preuss* 1322 ! Also in French Cameroons, Spanish Guinea, Gabon, Belgian Congo and Angola.

2. **Q. pellegriniana** (*Exell*) *Exell* in J. Bot. 69 : 121 (1931). *Combretum pellegrinianum* Exell in J. Bot. 67 : 177 (1929). Shrub with purple-velutinous flowers ; upper leaves purplish when dry and probably coloured and bract-like when fresh.
S.Nig.: Oban *Talbot* 498 ! Also in Gabon.

3. **Q. indica** *Linn.*—F.T.A. 2 : 435 ; Engl. & Diels Monogr. Afr. Combretac. 5, fig. 3 ; Chev. Bot. 265 ; Exell in J. Bot. 69 : 124. Scandent shrub, often on river banks ; petals often white outside and red inside, or white and turning red first on the outside ,later turning entirely red ; commonly cultivated.
Fr.Sud.: Ouagadougou *Chev.* 24681. **S.L.:** Freetown (May) *Deighton* 2727 ! **Iv.C.:** various localities *fide* Chev. *l.c.* **G.C.:** Karega (Apr.) *Williams* 113 ! R. Volta, Yeji (Apr.) *Bally* 180 ! **Togo:** Kratchi *Anderson* 8 ! **Dah.:** Zagnanado *Chev.* 23084. **N.Nig.:** Nupe *Barter* 1118 ! R. Kaduna (Apr.) *Dalz.* 433 ! R. Benue, Lokoja (Oct.) *Parsons* 158 ! **S.Nig.:** Abeokuta *Rowland* ! Calabar R. (Feb.) *Mann* 2289 ! **Br.Cam.:** Cameroons R. (Jan., June) *Mann* 20 ! 426 ! 2212 ! Victoria (Apr.) *Hutch. & Metcalfe* 166 ! Widespread in tropical Africa and Asia ; cultivated throughout the Tropics. (See Appendix, p. 80.)

5. **GUIERA** Juss., Gen. Pl. 320 (1789) ; F.T.A. 2 : 418.

A small shrub, with scattered black dots ; branchlets softly tomentellous ; leaves opposite or subopposite, oblong-elliptic, rounded or slightly cordate at base, mucronate at apex, 3–5 cm. long, 1·5–3 cm. broad, softly tomentose on both surfaces with scattered black glands beneath ; petiole without a pair of glands ; flowers in dense shortly pedunculate involucrate heads, the latter about 1 cm. in diam. ; bracts enclosing the flowers in bud, ovate, about 7 mm. long ; petals very narrow ; fruits linear, radiating, 3–4 cm. long, crowned by the persistent perianth, densely silky-villous .. .. *senegalensis*

G. senegalensis *J. F. Gmel.* in Linn. Syst. Nat. ed. 13, 2 : 675 (1791) ; F.T.A. 2 : 418 ; Engl. & Diels Monogr. Afr. Combretac. 2, fig. 2 ; Chev. Bot. 259 ; Aubrév. Fl. For. Soud.-Guin. 90. Grey foliage and yellowish flowers. Abundant in sandy wastes and semi-desert areas of the north.
Sen.: *Döllinger* ! Kayes (Dec.) *Chev.* 2. Samandiniéry (Feb.) *Chev.* 2152 ! **Gam.:** *Brown-Lester* ! Genieri (fl. & fr. Feb.) *Fox* 44 ! **Fr.Sud.:** various localities. **Port.G.:** Pussubé (fl. & fr. Feb.) *Esp. Santo* 1132 ! **Fr.G.:** Kouroussa *Pobéguin* 817 ! Boké *Chillou* ! **Fr.Nig.:** Niamey (fl. & fr. Oct.) *Hagerup* 469 ! **N.Nig.:** Sokoto (fl. & fr. Dec.) *Dalz.* 434 ! Katagum *Dalz.* 134 ! Bornu (fl. & fr. Apr.) *E. Vogel* 84 ! Zaria *Baikie* ! Bauchi Plateau (fl. & fr. July) *Lely* P. 561 ! Extends to A.-E. Sudan. (See Appendix, p. 79.)

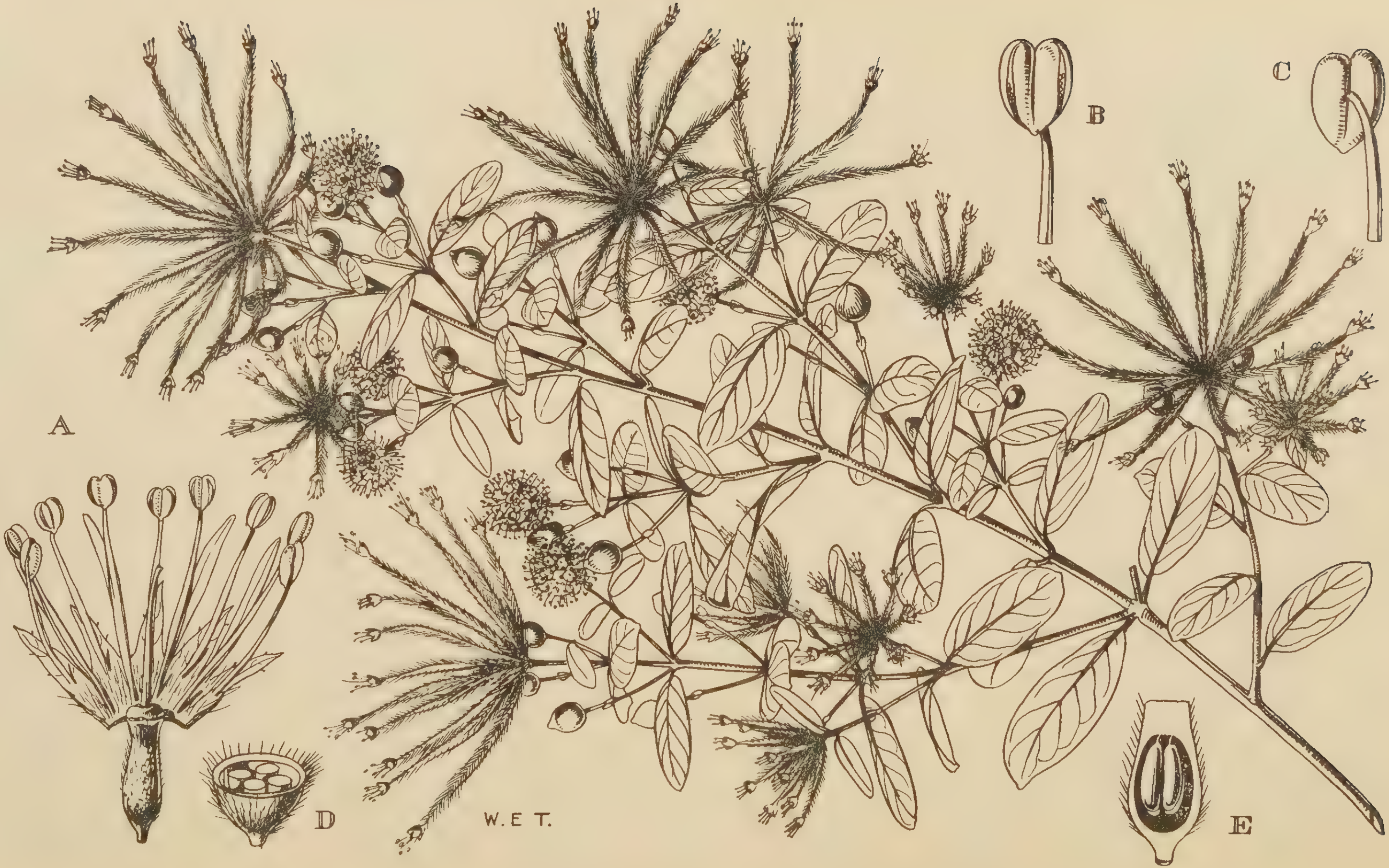

FIG. 104.—GUIERA SENEGALENSIS *J. F. Gmel.* (COMBRETACEAE).

A, flower partly laid open. B, C, stamens, front and back. D, cross-section of ovary. E, vertical section of ovary.

6. TERMINALIA Linn.—F.T.A. 2 : 415.

- Fruits broader than long, with wide wings ; coastal and forest species :
  - Fruits rhomboid, about 2·5 cm. long and 3·5 cm. broad ; ovary densely rusty-tomentose ; leaves subverticillate, obovate, subacute, 7–14 cm. long, 4–6 cm. broad, slightly pubescent mainly on the nerves beneath, often very densely so when young ; coastal species .. .. 1. *scutifera*
  - Fruits transversely oblong, about 2 cm. long and 5 cm. broad ; ovary shortly tomentellous ; leaves crowded, long-petiolate, with a pair of subopposite glands on the sides of the petiole, lamina obovate, subacute, 10–17 cm. long, 6–10 cm. broad, glabrous ; tall tree of forest .. .. 2. *superba*
- Fruits longer than broad ; mostly savannah species (but see Nos. 3 and 7) :
  - Fruit fleshy, not or scarcely winged, ellipsoid, 4–6·5 cm. long, 2·5–3·5 cm. broad ; leaves obovate, narrowed to the rounded or cordate base, 15–25 cm. long, 10–15 cm. broad ; introduced species .. .. 3. *catappa*
  - Fruits dry, broadly winged ; savannah species (except No. 7) :
    - Leaves elongate-obovate, gradually attenuate to the normally sessile or subsessile base, rarely with a distinct petiole, 15–35 cm. long, 6–12 cm. broad, lateral nerves numerous and prominent on both surfaces ; young and mature shoots glabrous ; flowers glabrous or sparsely pubescent ; fruits oblong, 8–13 cm. long, 3–4 cm. broad, glabrous .. .. 4. *macroptera*
    - Leaves always distinctly petiolate, usually pubescent or tomentose, at least on the young shoots :
      - Fruits glabrous, at least when mature ; flowers glabrous outside, or pubescent :
        - Fruits oblong, lanceolate, or narrowly elliptic, 5–9 cm. long, 2–3·5 cm. broad ; leaves variable, oblong, or narrowly to broadly elliptic, 10–30 cm. long, 3–11 cm. broad, glabrous, or pubescent and then glabrescent beneath.. 5. *laxiflora*
        - Fruits broadly elliptic, 3–5 cm. long, 2–3·5 cm. broad ; leaves obovate-elliptic, 7–11 cm. long, 2·5–7·5 cm. broad, puberulous or glabrescent beneath 6. *brownii*
      - Fruits densely puberulous or tomentellous all over ; flowers densely tomentellous or tomentose outside :
        - Forest species, with tall straight bole ; leaves obovate, narrowed from above the middle to the base, abruptly and shortly acuminate, 7–12 cm. long, 3–5·5 cm. broad, with very prominent lateral nerves, almost glabrous ; fruits oblong, 7–10 cm. long, 2–2·5 cm. broad .. .. 7. *ivorensis*
        - Savannah species, with short gnarled boles ; leaves hairy, often densely so :
          - Leaves up to 20 cm. long and 7 cm. broad ; fruits up to 7 cm. long and 3 cm. broad :
            - Mature leaves pubescent only on the nerves beneath with the glaucous surface of the lamina clearly visible between the hairs, or almost glabrous ; lamina more or less elliptic, 9–15 cm. long, 3–8 cm. broad ; fruits oblong, 5–7 cm. long, 1·5–2·5 cm. broad .. .. 8. *glaucescens*
            - Mature leaves densely tomentose or silky all over the lower surface :
              - Leaves closely appressed-silky and silvery beneath, upper surface shining ; lamina lanceolate or elliptic, acute or obtuse at apex, 7–10 cm. long, 3–4·5 cm. broad ; fruits 5·5–6·5 cm. long, 2–3 cm. broad, densely white-silky 9. *albida*
              - Leaves loosely tomentose with curly hairs beneath, drying brown, upper surface matt ; lamina elongate-oblong or oblong-elliptic, obtuse at apex, 9–20 cm. long, 3–7 cm. broad ; fruits 5–6 cm. long, 2–3 cm. broad, tomentose 10. *avicennioides*
          - Leaves 20–35 cm. long, 10–18 cm. broad, very broadly oblong-elliptic, with a long stout petiole ; densely tomentose beneath, becoming less so with age ; venation very strongly reticulate beneath ; fruits 7–10 cm. long, 2·5–4 cm. broad .. .. 11. *mollis*

1. **T. scutifera** *Planch. ex Laws.* in F.T.A. 2 : 417 (1871) ; Engl. & Diels Monogr. Afr. Combretac. 25, t. 14 A ; Chev. Bot. 258. Tree of sea shore, to 45 ft. high, gnarled and branching from the base ; deciduous.
Port.G.: Bolama *Carvalho* 316. Formosa (young fr. Apr.) *Esp. Santo* 1989 ! Pefiné, Bissau *Esp. Santo* 1703 ! **Fr.G.:** *Heudelot* 907 ! Conakry (Feb.) *Debeaux* 141 ! *Chev.* 13045. **S.L.:** *Afzelius.* Lumley Beach (Feb.) *Deighton* 534 ! Hamilton (Dec.) *Lane-Poole* 87 ! Kent (Dec.) *Dawe* 419 ! (See Appendix, p. 83.)

2. **T. superba** *Engl. & Diels* l.c. 26, t. 14 B (1900) ; Chalk & Burtt Davy, For. Trees & Timbers Brit. Emp. 2 : 30 ; Aubrév. Fl. For. C. Iv. 3 : 58, t. 263, 5–8. *T. altissima* A. Chev. Vég. Util. 5 : 151 (1909) ; Chev. Bot. 256. Forest tree, to 150 ft. (rarely to 200 ft.) high, with large thin buttresses, clean straight bole and rather flat crown ; bark ashy grey.
Fr.G.: Kissidougou (Feb.) *Chev.* 20702 ! **S.L.:** Bandama (Feb.) *Aylmer* 579 ! Hangha (Feb.) *Lane-Poole* 146 ! **Iv.C.:** Azaguié *Chev.* 22307*b* ! Bouroukrou *Chev.* 16104. **G.C.:** Kwahu (young fr. Apr.) *Johnson* 668 ! Kumawo (fr. June) *Chipp* 457 ! Dunkwa (fr. June) *Vigne* 878 ! Asankrangwa (Jan.) *Brent* 3 ! **Dah.:** Zagnanado *Chev.* 22954. **N.Nig.:** Lapai *Yates* 37 ! **S.Nig.:** *Dodds* 393 ! Shasha F.R. (fr. Mar.) *Jones & Onochie* FHI 16678 ! Sapoba (Nov.) *Kennedy* 1682 ! Abakaliki (fr. Oct.) *Rosevear* 18/28 ! **Br.Cam.:** Victoria (fr. Jan.) *Preuss* 1300 ! *Maitland* 232 ! Tiko (Jan.) *Dunlap* 177 ! Also in French Cameroons, Spanish Guinea, Gabon Cabinda and Belgian Congo. (See Appendix, p. 83.)

3. **T. catappa** *Linn.*—F.T.A. 2 : 416 ; Engl. & Diels l.c. 9. Tree, to 80 ft. high, with whorled branches and dark green, shining leaves ; a native of India, but introduced and widely cultivated in our area, sometimes subspontaneous.
Sen.: St. Louis *Brunner* 55 ! **S.L.:** Moyamba *Lane-Poole* 2 ! **Lib.:** Monrovia *Baldwin* 5691 ! **G.C.:**

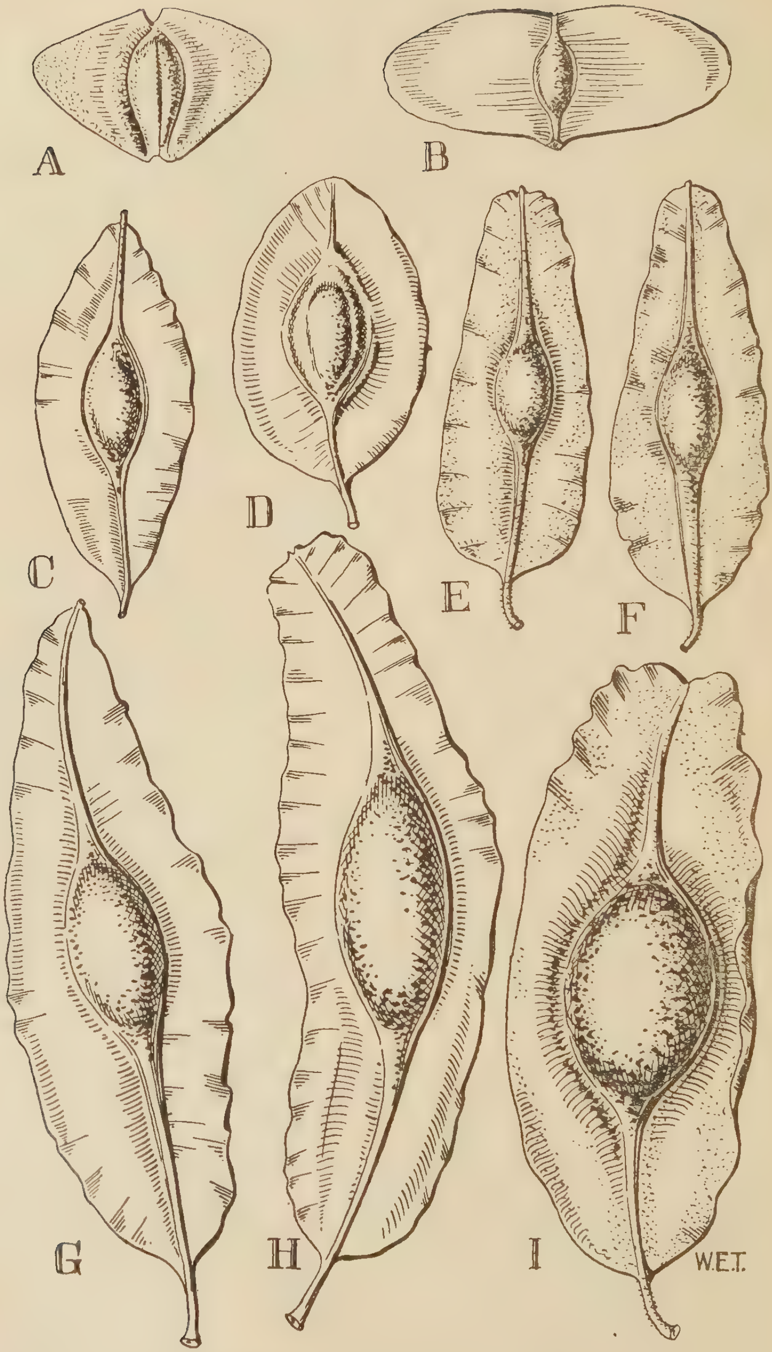

Fig. 105.—Fruits of Terminalia (Combretaceae).

A, *T. scutifera* Planch. ex Laws. B, *T. superba* Engl. & Diels. C, *T. laxiflora* Engl. D, *T. brownii* Fres. E, *T. glaucescens* Planch. ex Benth. F, *T. avicennioides* Guill. & Perr. G, H, *T. macroptera* Guill. & Perr. I, *T. mollis* Laws.

Achimota (Jan.) *Irvine* 1950! **S.Nig.:** various localities *fide* Keay. **Br.Cam.:** Victoria *Preuss*. Widely cultivated in the tropics.

4. **T. macroptera** *Guill. & Perr.*—F.T.A. 2 : 416 ; Engl. & Diels l.c. 11 ; Aubrév. Fl. For. Soud.-Guin. 129, t. 18, 2 (excl. syn. *T. elliotii* Engl. & Diels). *T. chevalieri* Diels in Engl. Bot. Jahrb. 39 : 510 (1907) ; Chev. Bot. 257. Savannah tree, to 30 ft. high, with black fissured bark and large, bright green leaves ; usually in relatively moist situations.
Sen.: *Perrottet*. **Gam.:** *Ingram*! *Dawe* 15! **Fr.Sud.:** N. Yatenga (fr. Aug.) *Chev.* 24798! **Port.G.:** Bissalanca, Bissau (fr. Jan.) *Esp. Santo* 1640! **Fr.G.:** Kouroussa *Pobéguin* 846. **S.L.:** *Dudgeon*! **Iv.C.:** Touba *Aubrév.* 1234! **G.C.:** Sa (fr. Mar.) *Kitson* 845! **Togo:** Atakpame *Mildbr.* 7456! **N.Nig.:** S. Sokoto (fr. May) *Lely* 818! Kontagora (Feb.) *Dalz.* 284 (partly)! Katagum *Dalz.* 308! 372! Jos (fr. Aug.) *Mackay* FHI 1431! S. Bornu (fr. Dec.) *Foster* 89! **S.Nig.:** Old Oyo F.R. (fl. & fr. Feb.) *Keay* FHI 16015! Abakaliki *Rosevear* 38/29! Extends to A.-E. Sudan and Uganda. (See Appendix, p. 82.)

5. **T. laxiflora** *Engl.* in Engl. & Diels Monogr. Afr. Combretac. 12, t. 2 B (1900) ; Aubrév. l.c. 131, t. 18, 1, t. 19, 1 (incl. var. *pubescens* Aubrév.). *T. elliotii* Engl. & Diels l.c. (1900). *T. sokodensis* Engl. Bot. Jahrb. 39 : 510 (1907) ; F.W.T.A., ed. 1, 1 : 226 ; Chalk & Burtt Davy l.c. 40. Savannah tree, to 36 ft. high ; rather similar to above and sometimes growing in the same communities with it ; leaves variable in shape and indumentum but always long-petiolate.
Fr.Sud.: Birgo *Dubois* 145. **Port.G.:** *Esp. Santo* 520! **S.L.:** Erimakuna (Mar.) *Sc. Elliot* 5200! Falaba (Apr.) *Deighton* 5402! Musaia *Deighton* 5486! **Iv.C.:** Bobo Dioulasso *Aubrév.* 1979! And several other localities *fide* Aubrév. *l.c.* **G.C.:** Karega (Apr.) *Williams* 151! Nsawkaw (Jan.) *Vigne* 3543! Kratchi to Birri (fr. Sept.) *Brent* 552! **Togo:** Sokodé-Basari *Kersting* 473. Yendi (fr. May) *Akpabla* 529! **Dah.:** Atacora Mts. *Chev.* 24152. **N.Nig.:** Dan Ja, Katsina (fr. May) *McElderry* FHI 16482! Karshe (Feb.) *Dalz.* 391! Basawa, Zaria (Apr.) *Keay* FHI 16103! Bauchi Plateau *Lely* 851–5! Naraguta (fr. June) *Kennedy* FHI 7258! Biu (fl. & fr. Mar.) *Kennedy* FHI 8053! Yola (May) *Dalz.* 91! **S.Nig.:** Olokemeji (fl. & fr. Mar.) *Keay & Foggie* FHI 22534! Enugu *Jones* FHI 1122! **Br.Cam.:** Furu, Bamenda (fl. & fr. Feb.) *Johnstone* 49/31! Extends to A.-E. Sudan. (See Appendix, p. 83.)

6. **T. brownii** *Fres.*—F.T.A. 2 : 415 ; Engl. & Diels l.c. 17, t. 8 A ; Aubrév. l.c. 135. A small tree, up to 30–40 ft. high ; on rocky hills.
N.Nig.: Bauchi Plateau (fr. Aug.) *Lely* P. 628! Kilba country, Yola Prov. (fr. July) *Dalz.* 94! Extends to Abyssinia and Somaliland, Angola, Uganda and E. Africa.

7. **T. ivorensis** *A. Chev.* Vég. Util. 5 : 152 (1909) ; Chalk & Burtt Davy l.c. 35 ; Aubrév. Fl. For. C. Iv. 3 : 56, t. 263, 1–4. Forest tree, to 150 ft. high, or more, with broad blunt buttresses, clean straight bole ; bark dark-brown or blackish, fissured.
Fr.G.: Lola to Nzo (Mar.) *Chev.* 20976. Nzérékoré (fr. Oct.) *Baldwin* 9716! **S.L.:** *Lane-Poole* 276! Njala (May) *Deighton* 1142! Rokupr (fr. Feb.) *Deighton* 4191! **Lib.:** Dukwia R. (Apr.) *Cooper* 370! Gbau, Sanokwele (young fr. Sept.) *Baldwin* 9424! **Iv.C.:** Makougnié (fr. Jan.) *Chev.* 16153! Yapo *Chev.* 22339! Guiglo *Aubrév.* 1226! **G.C.:** Dunkwa (young fr. June) *Vigne* 260! 877! Akotase (fr. Sept.) *Chipp* 569! E. Akim (June) *Johnson* 733! **S.Nig.:** Ibadan F.R. (May–Aug.) *Punch* 122! *Gilman*! Usonigbe F.R. (fr. Nov.) *Keay* FHI 28060! **Br.Cam.:** Likomba (fr. Dec.) *Mildbr* 10740! (See Appendix, p. 81.)

8. **T. glaucescens** *Planch. ex Benth.*—F.T.A. 2 : 416 ; Engl. & Diels l.c. 13 ; Chalk & Burtt Davy l.c. 39; Aubrév. Fl. For. Soud.-Guin. 132, t. 19, 2–3. *T. togoensis* Engl. & Diels l.c. ; Chev. Bot. 258. *T. baumannii* Engl. & Diels l.c. 14 ; Chev. Bot. 257. *T. passargei* Engl. in Engl. & Diels l.c. 16 ; Chev. Bot. 258. *T. longipes* Engl. Bot. Jahrb. 39 : 513 (1907). Savannah tree, to 40 ft. high ; bark dark grey, deeply fissured ; closely related to the tall forest species *T. ivorensis* A. Chev.
Fr.G.: Kouria (fr. Aug.) *Chev.* 14695! **S.L.:** Kabala (fl. July, fr. Sept.) *Thomas* 2207! *Deighton* 4817! Musaia (fl. July, fr. Feb.) *Deighton* 4223! 4821! **Iv.C.:** Middle Nzi Valley, N. Baoulé (fl. & fr. July) *Chev.* 22194! 22204! Bondoukou *Aubrév.* 1600! **G.C.:** Kumawo (June) *Chipp* 462! Egura (fr. Aug.) *Chipp* 739! Kintampo (Apr.) *Thompson* 73! R. Tafo, Nchenenchene (Apr.) *Kitson* 1049! **Togo:** Lome *Warnecke* 442! Bismarckburg (fr. Aug.) *Büttner* 155. Misahöhe (Apr.) *Baumann* 262. **Dah.:** Atacora Mts. (June) *Chev.* 24089! **N.Nig.:** Sokoto (May) *Lely* 815! Lokoja (fr. Sept.) *T. Vogel* 178! R. Gurara, Gornapara *Elliott* 186! Abinsi (fl. July, fr. Mar.) *Dalz.* 699! 700! **S.Nig.:** Awba Hills F.R. (fr. Oct.) *Jones* FHI 7301! Aboh *Barter* 330! Ikom *Rosevear* 48/29! **Br.Cam.:** Fang, Bamenda (Apr.) *Maitland* 1404! Extends to A.-E. Sudan. (See Appendix, p. 81.)

9. **T. albida** *Sc. Elliot* in J. Linn. Soc. 30 : 79 (1893) ; Aubrév. l.c. 133, t. 20, 1–2. *T. argyrophylla* Engl. & Diels Monogr. Afr. Combretac. 15, t. 6 C (1900). *Combretum sericeum* of F.T.A. 2 : 424, and of Chev. Bot. 264, not of G. Don. A savannah shrub or tree, to 40 ft. high ; all parts shining-silky-pubescent.
Sen.: Sokone-Messirah *Trochain* 3376. Niocola Koba *Trochain* 3515. Farancounda to Tambanala *Chev.* 3161. **Gam.:** *Dawe* 44! Genieri (fl. June, fr. Feb.) *Fox* 83! 110! **Fr.Sud.:** Bougouni to Sikasso *Aubrév.* 69–S. **Port.G.:** Catio (fr. June) *Esp. Santo* 2077! **Fr.G.:** Ditinn to Labé *Chev.* 12880! **S.L.:** Buyabuya, Wallia (Mar.) *Sc. Elliot* 4269! Bubuya (May) *Adames* 172! Batkanu (fl. Apr., fr. July) *Thomas* 20a! *Small* 139! Jigaya (fr. Nov.) *Thomas* 2667! Matiki (Apr.) *Deighton* 3220! Worowaia (Apr.) *Lane-Poole* 29!
[Hybrids between this species and the next probably occur.]

10. **T. avicennioides** *Guill. & Perr.*—F.T.A. 2 : 416 ; Engl. & Diels l.c. 14 ; Aubrév. l.c. 133, t. 20, 3–4. *T. lecardii* Engl. & Diels l.c. 15 ; Chev. Bot. 257. *T. dictyoneura* Diels in Engl. Bot. Jahrb. 39 : 512 (1907). Savannah tree, to 30 ft. high ; flowers and leafy shoots pinkish when young ; mature leaves greyish-green above and white beneath, drying brownish ; sometimes extremely abundant.
Sen.: *Lecard.* Albreda *Perrottet*. **Gam.:** *Ozanne*! **Fr.Sud.:** *fide* Aubrév. *l.c.* **Port.G.:** Canjadudi, Gabu (fr. Apr.) *Esp. Santo* 2512! **S.L.:** *Hutton*! **Iv.C.:** *Serv. For.* 1975! Tenkodogo *Aubrév.* 2489. **G.C.:** Tamale (Apr.) *Williams* 124! Pala to Narago (Mar.) *Kitson* 969! **Togo:** Sokodé (fr. Mar.) *Kersting* 32! Bawku (Apr.) *Vigne* 3763! **Dah.:** Agouagou (May) *Chev.* 23513! Savalou (fr. May) *Chev.* 23798! **N.Nig.:** Sokoto (fl. & fr. May) *Lely* 816! 817! Zamfara F.R. (fl. & fr. Apr.) *Keay* FHI 15886! 18071! Nupe *Barter* 1120! Katagum *Dalz.* 395! Bornu (Apr.) *E. Vogel* 71! **S.Nig.:** *Rowland* 9! Old Oyo F.R. (Feb.) *Keay* FHI 16278! Also in French Cameroons and Ubangi-Shari-Chad. (See Appendix, p. 81.)

11. **T. mollis** *Laws.* in F.T.A. 2 : 417 (1871), not of Zoll. ex Teysm. & Binn. (1866), name only, nor of (Presl) Vidal (1885). *T. torulosa* F. Hoffm. (1889)—Engl. & Diels l.c. 15 ; Chev. Bot. 258. *T. reticulata* Engl. Bot. Jahrb. 39 : 511 (1907), not of Roth (1821) ; F.W.T.A., ed. 1, 1 : 226 ; Aubrév. l.c. 132. *T. kerstingii* Engl. l.c. ; F.W.T.A., ed. 1, 1 : 226. Savannah tree, to 30 ft. high.
Fr.G.: Kollangui (Mar.) *Chev.* 12870. Kouroussa *Pobéguin* 251. Pita *Pobéguin* 2266. **Iv.C.:** Ferkéssédougou *Serv. For.* 2317. **G.C.:** Abetifi (fr. June) *Thompson* 85! Jugbwe (Apr.) *Thompson* 67! Bamboi (fr. May) *Vigne* 3835! Afram Plains (young fr. May) *Kitson* 1133! Yeji (fr. July) *Vigne* 1226! **Togo:** *Kersting* A. 196! Sokodé-Basari (fr. Nov.) *Kersting* 476. Yendi (Apr.) *Vigne* 1690! Widespread in tropical Africa. (See Appendix, p. 82.)

7. CONOCARPUS Linn.—F.T.A. 2 : 417.

A shrub ; branchlets slightly winged, finely appressed-pubescent ; leaves lanceolate, acute at both ends, narrowed to a short winged biglandular petiole, 6–9 cm. long, 2–3·5 cm. broad, glabrous or nearly so, with several pairs of arcuate lateral nerves ;

flowers in dense ellipsoid heads, the latter more or less paniculate, about 1·5 cm. long ; petals absent ; fruits densely imbricate, slightly recurved .. *erectus*

C. erectus *Linn.*—F.T.A. 2 : 417 ; Engl. & Diels Monogr. Afr. Combretac. 32 ; Chev. Bot. 259 ; Exell in J. Bot. 69 : 127. About 10 ft. high ; on seashore and in salt marshes near the coast.
Sen.: *Leprieur* ! Dakar (Jan.) *Hagerup* 770 ! Carabane (Jan.) *Chev.* 2158. **Port.G.:** Bissau (fr. Feb.) *Esp. Santo* 1836 ! **Fr.G.:** *Heudelot* 783 ! **S.L.:** *T. Vogel* 164 ! Kent *Smythe* 248 ! Freetown (fr. Mar.) *Dalz.* 959 ! Bendu, Kente Creek (fr. Mar.) *Adames* 12 ! **Lib.:** Grand Cess (fr. Mar.) *Baldwin* 11616 ! **S.Nig.:** Bonny R. (fr. Oct.) *Mann* 505 ! **Br.Cam.:** Victoria (fr. May) *Maitland* 720 ! Also on the coasts of other parts of tropical W. Africa and of tropical and subtropical America. (See Appendix, p. 79.)

8. ANOGEISSUS (DC.) Wall.—F.T.A. 2 : 417.

Branchlets tomentose, leaves alternate, elliptic to ovate-lanceolate, obtuse and mucronate, or acute at apex, 2–8 cm. long, 1·2–3·5 cm. broad ; at first densely silky, then laxly pubescent beneath ; receptacle above the ovary consisting of a narrow tubular lower portion, and a cup-shaped upper portion ; fruits in subglobose cone-like heads ; each fruit broadly winged, beaked by the persistent tubular portion of the receptacle *leiocarpus*

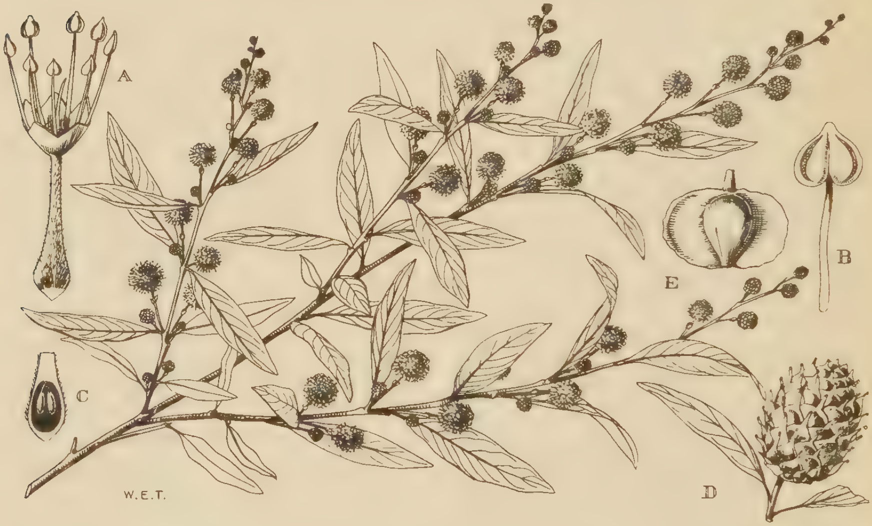

FIG. 106.—ANOGEISSUS LEIOCARPUS (*DC.*) *Guill. & Perr.* (COMBRETACEAE).

A, flower. B, stamen. C, vertical section of ovary. D, fruiting head. E, single fruit showing wings and persistent base of calyx-tube.

A. leiocarpus (*DC.*) *Guill. & Perr.*—F.T.A. 2 : 418 ; Engl. & Diels Monogr. Afr. Combretac. 31 ; Chev. Bot. 259 ; Aubrév. Fl. For. Soud.-Guin. 135. *Conocarpus leiocarpus* DC. Prod. 3 : 16 (1828). *A. schimperi* Hochst. ex Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 227 (1927) ; Aubrév. Fl. For. C. Iv. 3 : 60. *A. leiocarpus* var. *schimperi* (Hochst. ex Hutch. & Dalz.) Aubrév. Fl. For. Soud.-Guin. 135 (1950). A tree to 70 ft. high, with grey bark (becoming blackish in old trees) and light green or ashen foliage, often with drooping branches ; flowers greenish-yellow, with a reddish disk with white hairs. There are several ecological forms of this species which extends from the driest savannah to the borders of the forest zone, usually in moist situations but also in relatively dry situations in some northern areas. Specimens from the drier areas tend to have smaller leaves and more hairy flowers but there are too many intermediates for varieties or species to be distinguished.
Sen.: L. Panie-Foul *Perrottet.* **Gam.:** *Saunders* 75 ! **Fr.Sud.:** Kita (fr. Aug.) *Chev.* 2156 ! Bamako (May) *Hagerup* 45 ! **Fr.G.:** Kouroussa *Pobéguin* 870 ! Fouta Djalon *Pobéguin* 1924. **Iv.C.:** N. Baoulé (July) *Chev.* 22188 ! Bondoukou *Aubrév.* 701 ! Banco *Martineau* ! **G.C.:** Yeji (Aug.) *Pomeroy* 1348 ! Turo (July) *C. Saunders* 806 ! Woase (June) *Chipp* 488 ! Odumasi (Aug.) *Johnson* 1091 ! Ejura (Aug.) *Chipp* 738 ! **Fr.Nig.:** Zinder *Chev.* 25206 ! **Dah.:** *Le Testu* 178 ! **N.Nig.:** Zamfara F.R. (Apr.) *Keay* FHI 16151 ! Samaru, Zaria (Aug.) *Keay* FHI 28031 ! Anara F.R. (May) *Keay* FHI 19195 ! Zungeru (Oct.) *Dalz.* 102 ! Gurara R. (July) *Elliott* 185 ! **S.Nig.:** Olokemeji *Foster* 103 ! Abakaliki (Oct.) *Rosevear* 19/28 ! **Br.Cam.:** Kentu, Bamenda (June) *Maitland* 1581 ! Extends to A.-E. Sudan, Abyssinia and Eritrea. (See Appendix, p. 73.)

9. LAGUNCULARIA Gaertn.—F.T.A. 2 : 419.

A small tree ; branchlets glabrous ; leaves opposite, petiolate, obovate or elliptic, rounded and mucronate at apex, 6–10 cm. long, 4–5 cm. broad, glabrous, with several slightly recurved lateral nerves ; petiole with a pair of glands towards the top ; flowers subpaniculate, sessile on the axis ; bracts deciduous, ovate ; axis puberulous ; bracteoles adnate to the calyx-tube ; fruits shortly club-shaped, ribbed, about 2 cm. long, shortly pubescent .. .. *racemosa*

L. racemosa *Gaertn.*—F.T.A. 2 : 419 ; Engl. & Diels Monogr. Afr. Combretac. 33, fig. 4 ; Chev. Bot. 260 ; Aubrév. Fl. For. C. Iv. 3 : 52, t. 262, 6–10. Growing in mangrove swamps of tropical America and West Africa.

Sen.: Carabane (Jan.) *Chev.* 2159. **S.L.:** Wellington (Mar.) *Kirk* 46! Waterloo (June) *Lane-Poole* 290! Kumrabai (Dec.) *Thomas* 6952! 7081! Turtle Isl. (fl. & fr. Nov.) *Deighton* 2360! **Lib.:** Grand Bassa (July) *T. Vogel* 110! **G.C.:** *Burton*! Bushua (fr. Apr.) *Chipp* 176! **S.Nig.:** Lagos *Dalz.* 1057! Bonny (fr. Oct.) *Holland* 144! Brass (fr. Dec.) *Unwin* 22! Nun R. *T. Vogel* 52! **Br.Cam.:** Victoria (Feb., Apr.) *Dalz.* 8179! *Maitland* 388! (See Appendix, p. 80.)

70. RHIZOPHORACEAE

Trees or shrubs, frequently on maritime shores ; branches swollen at the nodes. Leaves opposite and stipulate, rarely alternate and exstipulate, leathery, simple ; stipules interpetiolar, caducous. Flowers hermaphrodite, in axillary inflorescences. Calyx-tube adnate to the ovary or free ; lobes 3–14, persistent, valvate. Petals usually small, often notched, bifid or laciniate, convolute or inflexed in bud. Stamens equal to or usually more than the petals in number, often in pairs opposite the petals on the edge or at the base of a perigynous disk ; anthers 2- or many-celled. Ovary mostly inferior, 2–6-celled or 1-celled by suppression of the septa ; style simple or rarely styles several ; ovules 2 in each cell, rarely more, inserted towards the apex on the inner angle of the cell. Fruit mostly indehiscent, usually 1-seeded or the cells 1-seeded. Seeds with or without fleshy endosperm ; cotyledons terete or connate.

A small family, often partial to maritime shores ; leaves usually opposite and with interpetiolar stipules ; flowers small and inconspicuous.

Leaves apparently alternate, anisophyllous, with normally developed and small, usually caducous, leaves at each node, exstipulate ; ovary inferior, with 3–4 styles ; flowers small, spicate ; petals laciniate :
  Leaves oblique, with 1–3 strong longitudinal nerves on each side of the midrib ; inflorescence of solitary axillary spikes, or of 2–4 spikes borne near the base of lateral leafy shoots ; drupe 1-seeded .. .. 1. **Anisophyllea**
  Leaves pinnately nerved ; inflorescence a panicle of catkin-like spikes on leafless shoots ; drupe with 3–4 seeds .. .. 2. **Poga**
Leaves opposite or whorled, stipulate ; stipules interpetiolar ; style simple :
  Flowers in clusters on simple pedicels ; petals laciniate .. .. 3. **Cassipourea**
  Flowers in pedunculate cymes ; petals entire or nearly so :
    Filaments free, very short ; stipules large and enclosing the young buds ; seed germinating in the fruit on the tree ; calyx glabrous .. .. 4. **Rhizophora**
    Filaments united into a long tube ; stipules small ; seed not germinating on the tree ; calyx tomentellous .. .. 5. **Anopyxis**

1. ANISOPHYLLEA R. Br. ex Sabine—F.T.A. 2 : 412.

Leaves cuneate or obtuse at base :
  Spikes usually 2–4, borne at different levels near the base and below the leaves of young leafy lateral shoots which are themselves normally borne directly in the axils of older leaves ; inflorescence-axes and flowers on the outside puberulous, not glandular ; leaves acute or gradually acuminate at the apex :
    Young branchlets puberulous ; inflorescence-axes, bracts and outside of flowers more or less densely puberulous ; laciniae of petals without glandular swollen apices ; fruits oblong to obovoid-ellipsoid, 4–5 cm. long, 2·5–3 cm. diam. ; leaves varying from obliquely lanceolate-elliptic or ovate-lanceolate and about 7 cm. long by 2·5 cm. broad, to ovate and about 15 cm. long by 7 cm. broad ; secondary nerves nearly at right angles to the midrib, rather markedly parallel, main longitudinal nerves 1–2 on each side of the midrib .. .. 1. *laurina*
    Young branchlets long-hirsute ; inflorescence-axes, bracts and outside of flowers very sparsely puberulous ; bracts and calyx-lobes ciliate at the margins ; laciniae of petals with glandular swollen apices ; fruits subglobose to oblong, 2·5–3 cm. long, about 2 cm. diam. ; leaves obliquely ovate, 7–15 cm. long, 3–6 cm. broad ; secondary nerves forming an acute angle with the midrib, not markedly parallel ; main longitudinal nerves 1–2 on each side of the midrib .. .. 2. *meniaudi*
  Spikes solitary, supra-axillary, with 1–3 superposed buds between the spike and the petiole of the older leaf which subtends it ; inflorescence-axes and flowers on the outside densely hirsute and glandular ; branchlets with a few long spreading hairs, or glabrescent ; leaves obliquely rhomboid-elliptic or obovate-elliptic, rather abruptly long-acuminate, 4–8·5 cm. long (excluding the 5–15 mm. long acumen), 2–3·5 cm. broad, usually with only 1 strong longitudinal nerve on each side of the midrib .. .. 3. *sp. A*

Leaves cordate or subcordate at base :

Inflorescence-axes and flowers on the outside loosely pilose, the former very slender and only about 2 cm. long ; spikes solitary, slightly supra-axillary ; leaves ovate-oblong, acutely long-acuminate, 6–8 cm. long, 2·5–3 cm. broad, silky-pilose and rose-purplish when young ; 1–2 strong longitudinal nerves on each side of the midrib, arising from near the base of the leaf .. .. .. 4. *purpurascens*

Inflorescence-axes and flowers on the outside glabrous or sparingly puberulous, the former rather stout and 7–12 cm. long ; spikes probably borne in the same manner as species Nos. 1 and 2 above ; leaves obliquely oblong-ovate or oblong-elliptic, acuminate, 7·5–15 cm. long, 3–7 cm. broad, pubescent when young but soon glabrous, margin inrolled ; 2–3 strong longitudinal nerves on each side of the midrib, with at least one of the nerves arising 1–3 cm. above the base of the leaf .. 5. *sp. B*

1. **A. laurina** *R.Br. ex Sabine*—F.T.A. 2 : 413 ; Chev. Bot. 256. *A. strychnoides* Engl. & v. Brehm. in Engl. Bot. Jahrb. 54 : 373 (1917). *A. fissipetala* Engl. & v. Brehm. l.c. 377 (1917). Shrub or tree, 15–50 ft., or up to 70 ft. high ; locally abundant in secondary regrowth ; flowers yellow-green ; fruits yellow, often peach-pink or reddish on the sunned side, fleshy, edible. "Monkey Apple."
Port.G.: Bolama *Henriques* 2. **Fr.G.:** Rio Nunez (Jan.) *Heudelot* 559 ! 645 ! Farana (fl. Mar., fr. May) *Sc. Elliot* 5365 ! *Chev.* 13163 ! 13424 ! *Aubrév.* 3072 ! Mamou *Pobéguin* 1541 ! Bilima (Dec.) *Chev.* 14686 ! **S.L.:** *Don* ! Freetown (Dec.) *Barter !* *Sc. Elliot* 4154 ! Port Loko (Jan.) *Deighton* 1049 ! Waterloo (June) *Lane-Poole* 264 ! Njala (fl. Nov.–Mar., fr. May) *Deighton* 1863 ! 3055 ! 4731 ! 4758–61 ! 4964–6 ! Musaia *Sc. Elliot* 5118 ! (See Appendix, p. 84.)
2. **A. meniaudi** *Aubrév. & Pellegr.* in Bull. Soc. Bot. Fr. 83 : 704, fig. 1 (1937) ; Aubrév. Fl. For. C. Iv. 3 : 42, t. 258. Forest tree, to 70 ft. high ; fruit green with yellowish spots, or yellow.
S.L.: Kenema (fr. Aug.) *Deighton* 3143 ! Benduhun, Tunkia (Dec.) *Deighton* 3814 ! Dodo (fr. Apr.) *Deighton* 3916 ! **Iv.C.:** Djibi, Abidjan (Dec.) *Aubrév.* 880 ! 1719 ! Toulepleu *Aubrév.* 1192 !
3. **A.** sp. **A.**[1] *A. laurina* of F.W.T.A., ed. 1, 1 : 228, partly (Nigerian specimens), not of R.Br. ex Sabine. Evergreen tree, to 50 ft. high, with dense foliage ; flowers white ; fruits yellow.
S.Nig.: Udi Plateau (fl. Mar., fr. June) *Ainslie* ! *Kennedy* 3134 ! *Jones* FHI 6643 ! 6923 ! Cross River Div. *Macleod* ! Eket *Talbot* 3169 !
4. **A. purpurascens** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 228 (1927) ; Kew Bull. 1928 : 226 (1928). A tree.
S.Nig.: Oban *Talbot* !
5. **A.** sp. **B.**[1] Forest tree, to 120 ft. high, with clean straight bole.
S.Nig.: Okomu F. R. (young fr. Feb.) *Brenan* 9086 ! Ikom (Oct.) *Catterall* 46 !

Imperfectly known species.

1. **A. setosa** *Mildbr.* Wiss. Ergebn. 1910–11, 2 : 188 (1922), name only.
F.Po: Bokoko *Mildbr.* 6836.
2. **A. brachystila** *Engl. & v. Brehm.* in Engl. Bot. Jahrb. 54 : 378 (1917). Small shrub. Locality not traced, but possibly in our area.
"Südnigeria-Kamerun-Zone" : Dolo (June) *Schlechter* 12450.

2. POGA Pierre in Bull. Soc. Linn. Paris 2 : 1254 (1896).

A tree ; branches glabrous, purplish ; leaves elliptic, rounded at base, obtuse and oblique at apex, 12–15 cm. long, 6–7 cm. broad, leathery, loosely gland-dotted beneath ; lateral nerves numerous ; petiole flat above, about 2 cm. long ; flowers very small, arranged in panicles of catkin-like spikes on leafless shoots ; axis becoming woody ; sepals and petals 4 ; stamens 8 ; ovary inferior, 4-celled ; ovules solitary in each cell, pendulous ; fruit a large drupe, ellipsoid, about 6 cm. long, with fleshy exocarp and woody endocarp, with numerous resinous lacunae ; seeds without endosperm *oleosa*

P. oleosa *Pierre* in Bull. Soc. Linn. Paris 2 : 1254 (1896) ; Engl. in Notizbl. Bot. Gart. Berl. 5: 294–298, fig. 1 (1913) ; Holl. 2 : 305 ; F.W.T.A., ed. 1, 2 : 605 ; Kennedy For. Fl. S. Nig. 51. A forest tree, to 100 ft. high ; esteemed for its fruits, whose seeds yield a valuable oil.
S.Nig.: Oban *Talbot* 1636 ! Also in French Cameroons and Gabon. (See Appendix, p. 85.)

3. CASSIPOUREA Aubl.—Alston in Kew Bull. 1925 : 241–276 (1925). *Weihea* Spreng. —F.T.A. 2 : 410. *Dactylopetalum* Benth.—F.T.A. 2 : 411.

Calyx-tube shorter than the ovary, and much shorter than the 5 lanceolate calyx-lobes ; calyx-lobes spreading or reflexed, glabrous within ; leaves usually serrate or dentate :

Ovary glabrous, depressed at the apex ; leaves subentire or serrate, elliptic to oblong, cuneate to rounded at base, rounded or obtuse at apex, not acuminate, or only very shortly and obtusely so, 4–10 cm. long, 2–5·5 cm. broad.. .. 1. *congoensis*

Ovary pubescent, ridged and conical at the apex ; leaves coarsely dentate with 3–4 teeth in the upper half, lanceolate-elliptic, cuneate at base, rather long-acuminate, 5–15 cm. long, 2·5–6 cm. broad .. .. 2. *adami*

Calyx-tube generally longer than the ovary in the flower, as long, or longer than the erect triangular calyx-lobes :

Calyx within and ovary densely silky-hairy ; calyx cup-shaped :

Calyx 10–12 mm. long, pedicel 15–25 mm. long, articulated towards the apex ; flowers solitary ; stamens much shorter than the calyx ; leaves elliptic, acute at each end, 10–12 cm. long, 4–6 cm. broad .. .. 3. *firestoneana*

Calyx 3–4 mm. long, pedicels 1–3 mm. long ; stamens longer than the calyx :

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[1] Although readily distinguishable from other species in our area, the material of "sp A" and "sp. B" is not good enough for the description of new species and may in any case prove to be the same as species from other parts of Africa. The genus is in need of revision and more good specimens are required.

Flowers very numerous at each node, forming a dense cluster ; leaves lanceolate or elliptic-lanceolate, 5–6 cm. long, not more than 3 cm. broad, entire or nearly so 4. *eketensis*

Flowers few at each node, laxly arranged ; leaves broadly oblong or elliptic, rather abruptly acuminate, 7–14 cm. long, 3–6 cm. broad, distinctly toothed 5. *afzelii*

Calyx glabrous or puberulous within, campanulate ; ovary glabrous or pubescent :

Leaves obovate, or oblanceolate, very gradually narrowed to the base, 7–17 cm. long, 3–6·5 cm. broad ; flowers sessile in small clusters ; ovary puberulous towards the apex .. .. 6. *nialatou*

Leaves oblong, elliptic or ovate :

Ovary tomentose, or pilose towards the apex ; pedicels up to 2 mm. long :

Ovary tomentose all over ; flowers in dense many-flowered fascicles at the thickened nodes of the older parts of the branchlets ; leaves broadly elliptic, cuneate, or more rarely rounded, at base, 12–18 cm. long, 7–14 cm. broad ; petiole 6–9 mm. long .. .. 8. *barteri*

Ovary pilose towards the apex ; flowers in rather few-flowered fascicles ; leaves oblong, or oblong-elliptic, rounded, or more rarely cuneate, at base, 6–15 cm. long, 3–6 cm. broad ; petiole 8–13 mm. long .. .. .. 7. *ugandensis*

Ovary glabrous :

Venation of leaves rather lax and much less prominent than the main lateral nerves beneath ; lamina elliptic, 10–15 cm. long, 5–6·5 cm. broad, margin not revolute ; flowers distinctly pedicellate .. .. 9. *glabra*

Venation of leaves strongly reticulate, almost as prominent as the main lateral nerves above and beneath ; lamina oblong-elliptic to ovate-elliptic, 6–10 cm. long, 2·5–6 cm. broad, margin revolute ; flowers sessile or subsessile 10. *paludosa*

1. **C. congoensis** *R.Br. ex DC.* Prod. 3 : 34 (1828) ; Alston in Kew Bull. 1925 : 259 (*q.v.* for full synonymy); Aubrév. Fl. For. C. Iv. 3 : 46 ; Jac.-Fel. in Rev. Bot. Appliq. 1952 : 266. *C. africana* Benth. in Hook. Fl. Nigrit. 341 (1849). *Weihea africana* Benth. ex Oliv. F.T.A. 2 : 410 (1871). A shrub or small tree, sometimes half-scrambling, glabrous except on the young internodes and leaf- and flower-buds ; flowers few in clusters or solitary.
Sen.: M'bidjem *Thierry* 25! **Fr.G.:** Farana (Mar.) *Sc. Elliot* 5369! Kouroussa *Adam* 4703. **S.L.:** *Afzelius*. **Iv.C.:** Lalirabah *Aubrév.* 666! **G.C.:** Volta R. Gorge, Tiase (May) *Irvine* 3001! R. Volta, Kete-Krachi (June) *Vigne* 3879! Trawa (June) *Vigne* 4392! **Togo:** Lome (Mar.) *Warnecke* 99. **N.Nig.:** Lokoja (Sept.) *T. Vogel* 206! Nupe *Barter* 1670! Gurara R. (fr. July) *Elliott* 176! Abinsi (Apr.) *Dalz.* 634! **S.Nig.:** Lagos (Mar.) *Foster* 53! Olokemeji (Feb.) *Foster* 281! *Keay* FHI 22490! Also in French Cameroons and Belgian Congo.
2. **C. adami** *Jac.-Fel.* in Rev. Bot. Appliq. 1952 : 268, t. 9 (1952). Shrub, 10–20 ft. high, with dense foliage.
Fr.G.: Mt. Bala, Macenta (Mar.) *Adam* 4108! Mt. Djiba, Macenta to Guéckédou *Adam* 5841.
3. **C. firestoneana** *Hutch. & Dalz. ex Cooper & Record* in Yale Univ. For. Bull. 31 : 37 (1931) ; Jac.-Fel. l.c. 272, t. 11. Forest tree, to 85 ft. high, with low buttresses and long clear bole ; flowers white.
Lib.: Firestone Plantation, Dukwia R. (Oct., Nov.) *Cooper* 96! 112! (See Appendix, p. 85.)
4. **C. eketensis** *Bak. f.* in J. Bot. 52 : 3 (1914) ; Alston l.c. 265 ; Jac.-Fel. l.c. 270. A shrub or tree with terete, glabrous branches.
S.Nig.: Eket *Talbot* 3213! 3214!
5. **C. afzelii** (*Oliv.*) *Alston* in Kew Bull. 1925 : 265 (1925) ; Jac.-Fel. l.c. 270. *Weihea afzelii* Oliv. F.T.A. 2 : 411 (1871). *C. caesia* Stapf in J. Linn. Soc. 37 : 97 (1905). *Dactylopetalum parvifolium* Sc. Elliot in J. Linn. Soc. 30 : 78 (1894). *C. parvifolium* (Sc. Elliot) Stapf l.c. ; Alston l.c. 265. A slender-branched shrub, or tree, to 30 ft. high, with pale glaucous leaves ; flowers white.
S.L.: *Afzelius*! Colonial Reserve, Freetown (Jan.) *King-Church* 3! Kambia (Jan.) *Sc. Elliot* 4735! Kenema (Jan.) *Smythe* 232! **Lib.:** Kakatown *Whyte*! Monrovia *Whyte*! Brewer's Landing (Nov.) *Linder* 1401! Dukwia R. (Feb.) *Cooper* 214! Piatah (Dec.) *Baldwin* 10593! 10609! (See Appendix, p. 84.)
6. **C. nialatou** *Aubrév. & Pellegr.* in Bull. Soc. Bot. Fr. 83 : 706 (1937) ; Aubrév. Fl. For. C. Iv. 3 : 46, t. 260A , Jac.-Fel. l.c. 268. Large forest tree with cylindrical bole, without buttresses.
Iv.C.: Grabo *Serv. For.* 1292. Tabou (Dec.) *Serv. For.* 1676!
7. **C. ugandensis** (*Stapf*) *Engl.* Pflanzenw. Afr. 3, 2 : 673 (1921) ; Alston l.c. 272 (1925). *Dactylopetalum ugandense* Stapf in J. Linn. Soc. 37 : 515 (1906). Forest tree, to 80 ft. high, by streams.
Br.Cam.: Bagangu, Bamenda, 5,000 ft. *Johnstone* 312/32! Bali-Ngemba F.R., Bamenda (young fr. June) *Ujor* FHI 30415! Also in Belgian Congo and Uganda.
8. **C. barteri** (*Hook. f.*) *N.E. Br.* in Kew Bull. 1894 : 5 (1894) ; Alston l.c. 273 ; Aubrév. Fl. For. C. Iv. 3 : 46, t. 260 B ; Jac.-Fel. l.c. 270. *Dactylopetalum barteri* Hook. f. in F.T.A. 2 : 412 (1871) ; Chev. Bot. 256. Shrub or small tree, to 60 ft. high ; common in sandy soil or near swamps not far from the sea.
S.L.: York to Bawbaw *Deighton* 2746! **Lib.:** Grand Cess (young fr. Mar.) *Baldwin* 11615! **Iv.C.:** Tabou to Beriby *Chev.* 19981. **S.Nig.:** Lagos (Dec.) *Millen* 63! 112! *Dalz.* 1058! Oni *Sankey* 11! Sapoba (Jan.) *Kennedy* 2060! R. Nun *Barter* 2133! Mouth of Kwa Ibo R., Eket *Talbot* 3094! Extends to Angola. (See Appendix, p. 85.)
9. **C. glabra** *Alston* l.c. 274 (1925) ; Jac.-Fel. l.c. 270. A small tree with glabrous dark-brown branches.
S.L.: Njala (Jan.) *Deighton* 4036! **Togo:** Togo Plateau F.R. (Jan.) *Adogla* FH 4060! **S.Nig.:** Oban *Talbot* 1757!
10. **C. paludosa** *Hutch. & Dalz. ex Jac.-Fel.* l.c. 268, t. 10 (1952). Shrub, to 12 ft. high, near river in marsh forest ; flowers white or green, sweet-scented.
S.L.: *Thomas* 8694! Njala (July, Dec.) *Deighton* 1743! 2585!

Imperfectly known species.

1. **C.** (subgen. *Weihea*) sp. **A.** Large tree of montane forest ; complete flowers not known.
Br.Cam.: Bamenda *Lightbody* FHI 30108! 30115!
2. **C.** (subgen. *Weihea*) sp. **B.** Small forest tree ; complete flowers not known.
G.C.: Bobiri *Andoh* FH 5547! Asenanyo F.R. (Feb.) *Andoh* FH 4310! **S.Nig.:** Ondo *Lamb* 153!

4. RHIZOPHORA Linn.—F.T.A. 2 : 407.

Pedicels 6–15 mm. long, relatively slender ; buds acute at apex ; sepals 10–13 mm. long, 2·5–3·5 mm. broad ; radicle seldom exceeding 20 cm. long while still on the

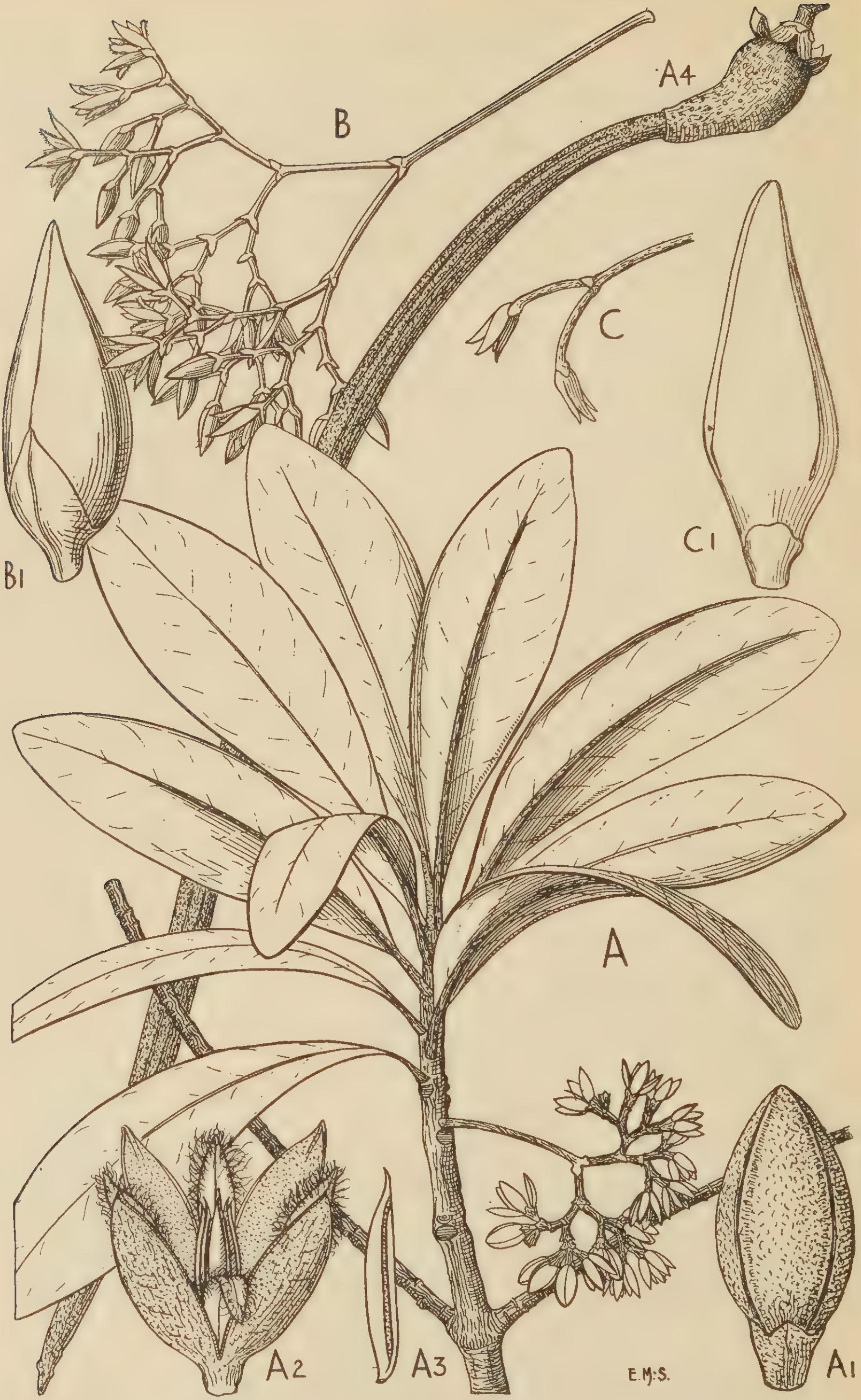

FIG. 107.—RHIZOPHORA SPP. (RHIZOPHORACEAE).

R. racemosa G. F. W. Mey.—A, leafy shoot and inflorescence, × $\frac{2}{3}$. A1, flower bud, × 4. A2, open flower, × 4. A3, stamen, × 8. A4, fruit and radicle, × $\frac{2}{3}$.
A is drawn from *Warnecke* 58 ; A1–4 from *Savory* UCI 69.
R. harrisonii Leechman—B, inflorescence, × $\frac{2}{3}$. B1, flower bud, × 4.
Drawn from *Savory* UCI 70.
R. mangle Linn.—C, inflorescence, × $\frac{2}{3}$. C1, flower bud, × 4.
Drawn from *Savory* UCI 71.

tree ; leaves narrowly oblong-elliptic, subacute to cuneate at base, obtuse at apex, 7–13 cm. long, 2·5–5 cm. broad, petiole 1–2 cm. long :

Inflorescence normally 2-flowered (rarely 3–4) ; peduncle 3–4 cm. long, pedicels 10–15 mm. long ; bracts obtuse ; pericarp 2–2·5 cm. long ; sepals greenish-yellow, midrib straw coloured when fresh ; flowers sweet-scented ; dark cork warts conspicuous on leaves beneath .. .. 1. *mangle*

Inflorescence much-branched and many-flowered, 7–12 cm. long, lax, with slender branches ; peduncle 3·5–8 cm. long ; pedicels 6–10 mm. long ; bracts more or less acute and spreading ; pericarp about 3·5 cm. long ; sepals yellowish-green, midrib reddish when fresh .. .. 2. *harrisonii*

Pedicels 3–4 mm. long, stout ; buds obtuse at apex ; sepals 8–11 mm. long, 3–4·5 mm. broad, greenish ; pericarp 3·5–5 cm. long ; radicle attaining 30–65 cm. long while still on the tree ; inflorescence much-branched, several- to many-flowered, 5–7 cm. long ; peduncle 1·5–4 cm. long, branches relatively short and stout, flowers rather crowded ; bracts obtuse ; leaves similar to above, midrib reddish when fresh 3. *racemosa*

1. **R. mangle** *Linn.* Sp. Pl. 1 : 443 (1753), partly ; F.T.A. 2 : 408 ; Leechman in Kew Bull. 1918 : 4 ; Chev. Bot. 255 ; Keay in Kew Bull. 1953 : 123. Shrub or small tree, to 15 ft. high, in mangrove swamps.
Sen.: R. Salum *Brunner* 102 ! Casamance (Jan.) *Chev.* 3007 ! 3008 ! **Fr.G.:** Tristao Isl. *Paroisse* 18 ! **S.L.:** Lumley (fl. & fr. June, Oct.) *Tindall* 1 ! 7 ! Mapotolon, Samu (fl. & fr. June, Sept.) *Adames* 230 ! 247 ! **S.Nig.:** Lagos (fl. Nov., fr. May, Nov.) *Savory* UCI 71 ! 704 ! Eket *Talbot* 3097 ! Also in Angola and on the east coast of tropical America and neighbouring islands.

2. **R. harrisonii** *Leechman* in Kew Bull. 1918 : 8 (1918) ; Keay l.c. 124. *R. racemosa* of many authors, partly, not of G. F. W. Meyer, including :—F.T.A. 2 : 408 (spec. *Vogel*) ; Chev. Bot. 255 (spec. *Chev.* 3006) ; F.W.T.A., ed. 1, 1 : 229. Shrub or small tree, to 20 ft. high ; in mangrove swamps.
Sen.: *Perrottet* 319 ! Casamance (Jan.) *Chev.* ! **Gam.:** *Don* ! Bitang Creek *Dawe* 76 ! Koto (May) *Fox* 105 ! **Fr.G.:** *Paroisse* 3 ! Conakry (May) *Pobéguin* 1174 ! **S.L.:** *T. Vogel* 166 ! Bonthe, Sherbro Isl. (Mar.) *Rhind* 5365 ! Lumley (fl. & fr. June) *Tindall* 4 ! Mapotolon, Samu (Sept.) *Adames* 248 ! Yelibana Isl. (Oct.) *Jordan* 623 ! Maswari (Oct.) *T. S. Jones* 242 ! **Lib.:** Grand Bassa (July) *T. Vogel* 113 ! **S.Nig.:** Lagos (Nov., Dec.) *Hagerup* 800 ! *Savory* UCI 70 ! Also in S. Tomé, Gabon, Angola, and on the east coast of tropical America and neighbouring islands.

3. **R. racemosa** *G. F. W. Mey.* Primit. Fl. Essequib. 185 (1818) ; Leechman l.c. 6 ; Keay l.c. 125 ; also of many authors in part, including F.T.A. 2 : 408 (spec. *Barter*) ; Chev. Bot. 255 (excl. spec. *Chev.* 3006) ; F.W.T.A., ed. 1, 1 : 229. A tree, to 130 ft. high, or forming a shrubby tangle 12–30 ft. high ; the commonest Red Mangrove in West Africa.
Sen.: mouth of R. Senegal *Roger* ! Casamance (Jan.) *Chev.* 3005 ! M'boro (May) *De Wailly* 4634 ! **S.L.:** Congo Town Bay (fl. & fr. Feb.) *Johnston* 64 ! 65 ! Kumrabai (Dec.) *Thomas* 6907 ! 6950 ! 7085 ! Tombo (Jan.) *Deighton* 1030 ! Bonthe, Sherbro Isl. (fl. & fr. Mar.) *Rhind* 5364 ! **Lib.:** Monrovia *Whyte* ! Sinoe Basin *Whyte* ! Duport (Nov.) *Linder* 1472 ! Fisherman's Lake (fl. & fr. Dec.) *Baldwin* 10897 ! **Iv.C.:** Assinie (fl. & fr. Apr.) *Chev.* 16311 ! Bingerville (fl. & fr. Feb.) *Chev.* 17359 ! **G.C.:** Axim (July) *Chev.* 13824 ! Botchiano, Accra *Irvine* 1031 ! **Togo:** Lome *Warnecke* 58 ! **Dah.:** (fr. Dec.) *Poisson* ! **S.Nig.:** Lagos (fl. & fr. May–Nov.) *Millen* 137 ! *Thompson* 1 ! Brass *Barter* 1850 ! 2078 ! Nun R. (fr. Sept.) *Mann* 492 ! **Br.Cam.:** Tiko (Feb.) *Maitland* 972 ! Also in Gabon, French Congo, Belgian Congo, Angola, and on the east coast of tropical America and neighbouring islands. (See Appendix, p. 85.)

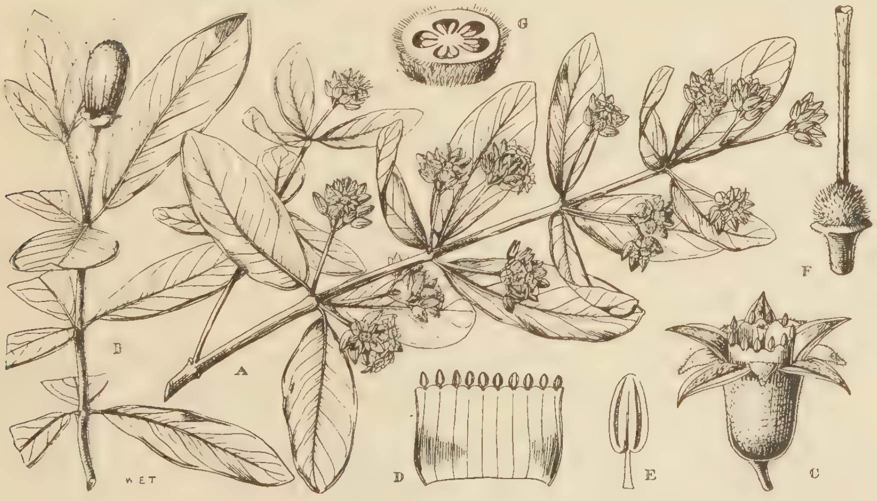

Fig. 108.—Anopyxis klaineana (*Pierre*) *Engl.* (Rhizophoraceae).

A, flowering branch. B, branch with fruit. C, flower. D, staminal tube opened out. E, anther. F, ovary and style. G, cross-section of ovary.

5. **ANOPYXIS** Engl. in E. & P. Pflanzenfam. Nachtr. 2 : 49 (1900) ; Sprague in Kew Bull. 1909 : 309. *Pynaertia* De Wild. (1908).

A large tree ; leaves verticillate, oblong to oblong-oblanceolate, rounded at apex, about 10 cm. long and 3–4 cm. broad, subcoriaceous, glabrous and shining, finely reticulate ; stipules linear ; flowers in short cymes ; calyx softly tomentellous, about 1 cm. long, lobes ovate, obtuse ; petals linear-oblanceolate, pubescent in the upper part, entire or toothed ; fruit narrowly ellipsoid, 3·5 cm. long, 2 cm. in diam., softly tomentellous .. .. *klaineana*

A. **klaineana** (*Pierre*) *Engl.* in E. & P. Pflanzenfam. Nachtr. 2 : 49 (1900). *Macarisia klaineana* Pierre in Bull. Soc. Linn. Paris n.s. 78 (1898). *Pynaertia ealaënsis* De Wild. in Ann. Mus. Congo 5, 2 : 262, t. 84 (1908). *A. ealaënsis* (De Wild.) Sprague in Kew Bull. 1909 : 311 ; F.W.T.A., ed. 1, 1 : 229 ; Aubrév. Fl. For. C. Iv. 3 : 42, t. 259 ; Kennedy For. Fl. S. Nig. 50. *A. occidentalis* A. Chev. Bot. 255. Forest tree, to 150 ft. high, with clean straight bole and dense symmetrical crown ; sepals green, petals yellow ; capsules grey. **S.L.:** Kambui F.R. *King* 41 ! **Lib.:** Dukwia R. (fr. Mar.) *Cooper* 288 ! **Iv.C.:** Dabou (fr. Feb.) *Chev.* 16209 ! Azaguié (Sept.) *Chev.* 22296 ! **G.C.:** Tarkwa (July) *Evans* 4 ! Nkwanta, W. Apollonia (Aug.) *Chipp* 334 ! **S.Nig.:** Sapoba (fl. most of year) *Kennedy* 351 ! 1542 ! Onitsha *Chesters* 211 ! Eket *Talbot* 3348 ! Also in French Cameroons, Gabon, Cabinda and Belgian Congo. (See Appendix, p. 84.)

71. HYPERICACEAE

With E. Milne-Redhead

Herbs, shrubs or rarely trees or climbers, with a resinous juice. Leaves opposite or verticillate, rarely alternate, simple, entire or glandular-dentate, rarely coriaceous, usually thin and marked with translucent or black dots, rarely small and scale-like ; stipules absent ; indumentum when present often stellate and ferruginous. Flowers terminal or rarely axillary, from solitary to cymose-paniculate or corymbose, usually yellow or white, hermaphrodite, actinomorphic. Sepals 4–5, imbricate. Petals 4–5, hypogynous, imbricate or contorted. Stamens numerous or rarely subdefinite, hypogynous, usually variously united into 3–5 or more bundles, rarely free ; anthers 2-celled, opening by longitudinal slits. Ovary of 3–5 (rarely 1) carpels, 1-celled or imperfectly or perfectly 2–5-celled ; styles the same number as the carpels, slender, free or rarely somewhat united, with a terminal capitate to clavate stigma ; ovules axile or pendulous, numerous and 2-seriate, or few or solitary. Fruit a septicidal or rarely loculicidal capsule, or a berry or drupe. Seeds without endosperm ; embryo straight or arcuate.

A widely dispersed family ; recognized by the opposite often gland-dotted leaves and the stamens united into bundles.

Petals glabrous inside :
  Fruit a capsule, or berry, with many seeds ; stamens not united into a tube, but often united into bundles .. .. 1. **Hypericum**
  Fruit a drupe with a single seed ; stamens united into a tube above 2. **Endodesmia**
Petals hairy inside ; fruit a berry or drupe ; stamens united into 5 bundles :
  Fruit a berry :
    Seeds numerous ; ovules about 5 in each of the 5 cells of the ovary .. 3. **Vismia**
    Seeds few ; ovules solitary or paired in each of the 5 cells of the ovary 4. **Psorospermum**
  Fruit a drupe with a crustaceous pericarp enclosing the 5 pyrenes 5. **Harungana**

1. HYPERICUM Linn.—F.T.A. 1 : 154.

Trees or shrubs ; ovary 5-celled ; stigmas 5 :
  Leaves narrowly elliptic, 1–2 (–3·5) cm. long, 3–6 mm. broad, with translucent nerves and glandular lines ; flowers solitary at the ends of the branches ; sepals about 1 cm. long ; petals obovate-oblong, 2–3 cm. long ; style about 5 mm. long, with linear branches about 3 mm. long .. .. 1. *lanceolatum*
  Leaves varying from elliptic to ovate or lanceolate, 3–8 cm. long, 0·8–3 cm. broad, with opaque nerves and translucent glandular dots and dashes ; flowers in 1–several-flowered cymes ; sepals 6–8 mm. long ; petals oblanceolate, 2·5–3·5 cm. long ; style about 1 cm. long, nearly entire .. .. 2. *riparium*
Herbaceous perennials ; petals 6–8 (–14) mm. long :
  Stems erect, up to 70 cm. high ; internodes much longer than the leaves ; leaves lanceolate or narrowly elliptic, 7–23 mm. long, 1–7 mm. broad ; flowers in a loose dichotomous cyme ; ovary 3-celled (rarely 4-celled) ; styles 3, free ; fruit a dehiscent capsule .. .. 3. *lalandii*

Stems prostrate, procumbent or ascending, up to 60 (rarely 90) cm. long, sometimes rooting at the lower nodes ; internodes rarely longer than the leaves ; leaves elliptic or obovate, 6–15 mm. long, 3–11 mm. broad ; flowers solitary, often appearing axillary ; ovary 5-celled ; styles 5, free ; fruit fleshy and indehiscent 4. *peplidifolium*

1. **H. lanceolatum** *Lam.*—F.T.A. 1 : 156 ; Hutch. in Kew Bull. 1923 : 224. *H. leucoptychodes* Steud. ex A. Rich.—Good in J. Bot. 65 : 330 ; Hutch. in Fl. Pl. S. Africa 20, t. 787 (1940). Shrub or tree to 40 ft. high ; flowers golden-yellow.
Br.Cam.: Cam. Mt., 4,000–10,000 ft. (Nov.–Apr.) *Mann* 1199 ! 2179 ! *Maitland* 302 ! 1099 ! *Brenan* 9556 ! Bangwa, Mamfe (Jan.) *Lobe Babute* 22/37 ! Besuako, Bamenda (fl. & fr. Mar.) *Johnstone* 86/31 ! Lakom, Bamenda (Apr.) *Maitland* 1632 ! **F.Po:** 9,000–10,000 ft. *Mann* 294 ! Moka, 4,000–5,000 ft. (Dec., Jan.) *Exell* 798 ! *Boughey* 28 ! Also on mountains of eastern Africa, from Abyssinia to Transvaal, also in Madagascar and the Mascarene Islands. (See Appendix, p. 88.)

2. **H. riparium** *A. Chev.* in Bull. Soc. Bot. Fr. 54, Mém. 8 : 8 (1907). *H. conrauanum* Engl. Bot. Jahrb. 40 : 555 (1908). Shrub to 10 ft. high.
Fr.G.: Diaguissa, 2,500 ft. (Apr.) *Chev.* 13460 ! **S.Nig.:** Mt. Koloishe, Obudu, 5,000–5,400 ft. (Dec). *Keay & Savory* FHI 25082 ! Ikwette Plateau, Obudu, 5,200 ft. (Dec.) *Keay & Savory* FHI 25219 ! **Br.Cam.:** Baberong *Conrau* 28 ! Bamenda, 6,200–8,000 ft. (Dec., Jan.) *Keay & Lightbody* FHI 28386 ! *Tamajong* FHI 22214 ! Lakom, Bamenda, 6,000 ft. (Mar., Apr.) *Maitland* 1435 ! 1488 ! Also in French Cameroons.

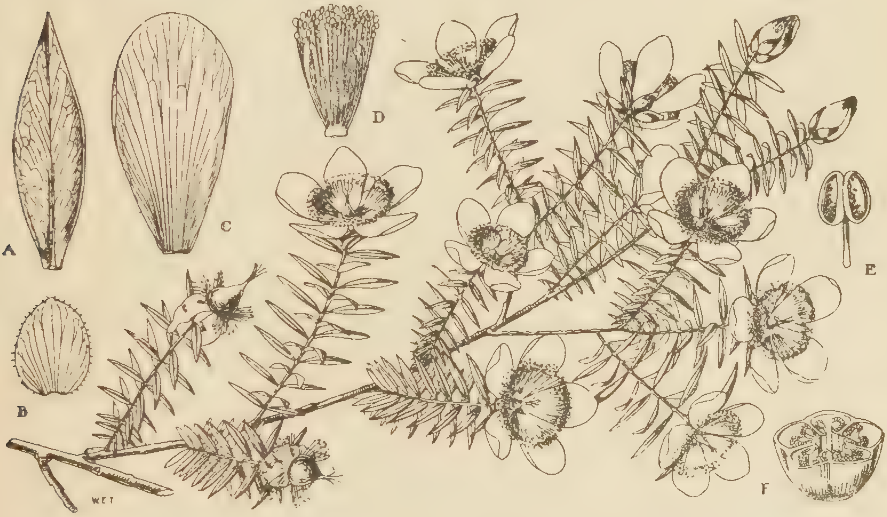

Fig. 109.—Hypericum lanceolatum *Lam.* (Hypericaceae).

A, leaf. B, sepal. C, petal. D, bundle of stamens. E, anther. F, cross-section of ovary.

3. **H. lalandii** *Choisy*—F.T.A. 1 : 155. Herb of moist grassland, with yellow or orange-yellow flowers.
N.Nig.: Bauchi Plateau (Aug.) *Lely* P. 622 ! Widespread from A.-E. Sudan to Angola and the Cape, also in Madagascar and in Bhutan, Khasia and SW. Yunnan.

4. **H. peplidifolium** *A. Rich.*—F.T.A. 1 : 155. Herb of mountain grasslands, often in moist places ; flowers yellow.
Br.Cam.: Litoka, Cam. Mt., 4,400 ft. (Apr.) *Maitland* 1088 ! Mann's Spring, Cam. Mt., 7,000 ft. (Mar.) *Richards* 9521 ! Bamenda (Jan., Feb.) *Migeod* 426 ! 496 ! L. Bambulue (May) *Ujor* FHI 30307 ! Belo, Bamenda (Apr.) *Maitland* 1468 ! Banso, Bamenda (fl. & fr. Jan.) *Keay* FHI 28694 ! **F.Po:** Moka (Jan.) *Exell* 764 ! Mioka (Dec., Jan.) *Guinea* 1913 ! *Boughey* 146 ! Also in French Cameroons, the highlands of eastern Africa from Abyssinia to S. Rhodesia, and in Angola.

Imperfectly known species.

H. sp. Flowers not known, but leaves distinct from any of the above species.
F.Po.: El Pico, 7,300 ft. *Boughey* 137 !

2. ENDODESMIA Benth.—F.T.A. 1 : 157.

A shrub or small tree ; branchlets finely longitudinally lined, glabrous ; leaves opposite, oblong-lanceolate, obtusely caudate-acuminate, more or less cuneate at the base, 6–10 cm. long, 2–3 cm. broad, with numerous close parallel lateral nerves, and scattered small blackish glands on the lower surface ; petiole 3–4 mm. long ; flowers cymose ; sepals oblong-lanceolate, acute, shortly united at the base, coriaceous, 5 mm. long, keeled ; petals yellow, contorted, about twice as long as the sepals ; anthers apiculate ; fruits about 1·5 cm. long, on thickened pedicels *calophylloides*

E. calophylloides *Benth.*—F.T.A. 1 : 157. In swamp forest, by rivers.
S.Nig.: Sapoba (fl. Feb., fr. Oct.) *Kennedy* 1787 ! *A. F. Ross* 213 ! *Richards* 3919 ! Calabar *Chev.* 13628 !
Br.Cam.: Cameroons R. (June) *Mann* 424 ! Also in French Cameroons, Gabon and Cabinda.

3. **VISMIA** Vand. Fl. Lusit. Brasil. 51 (1788) ; F.T.A. 1 : 160.

Inflorescence paniculate, equalling or exceeding the leaves ; flowers numerous, small, subumbellate on pedicels 1–2 mm. long ; sepals 1·5–2 mm. long ; stamens 4–6 in each bundle ; leaves broadly ovate-elliptic, cordate at base, shortly acuminate, 6–12 cm. long, 3·5–7 cm. broad, puberulous then glabrescent beneath, with numerous opaque glands, drying a rich reddish-brown colour .. .. 1. *rubescens*

Inflorescence a pair of pedunculate subumbellate cymes, shorter than the leaves, usually borne at the apex of short lateral shoots bearing two pairs of leaves, the lower pair much smaller than the upper pair which subtend and exceed the cymes ; pedicels 6–10 mm. long ; sepals about 4 mm. long ; stamens 20–40 in each bundle ; leaves elliptic or elliptic-lanceolate, cuneate or obtuse at base, acutely acuminate, stellate-puberulous beneath with black glands, not drying reddish .. 2. *guineensis*

1. **V. rubescens** *Oliv.* F.T.A. 1 : 160 (1871) ; Exell & Mendonça Consp. Fl. Ang. 1 : 124. A climbing shrub, attaining 20 ft.
S.Nig.: Eket *Talbot* 3296 ! Also in Spanish Guinea, Gabon, Belgian Congo and Cabinda.

2. **V. guineensis** (*Linn.*) *Choisy* Monogr. Hyp. 36 (1821). *Hypericum guineense* Linn. Diss. Hyp. 4, t. 8, fig. 1 (1776) ; Amoen. Acad. 8 : 321 (1785). *Psorospermum guineense* (Linn.) Hochr. in Ann. Conserv. Jard. Bot. Genèv. 21 : 57 (1919), partly (excl. syn. *P. senegalense* Spach, and ref. Guill. & Perr. Fl. Seneg. 1 : 107). *V. leonensis* Hook. f. in Fl. Nigrit. 243 (1849) ; F.T.A. 1 : 161 ; Chev. Bot. 50 ; F.W.T.A., ed. 1, 1 : 230. *V. leonensis* var. *macrophylla* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 230 (1927) ; Kew Bull. 1928 : 227. *V. laurentii* De Wild. var. *polyandra* Hochr. l.c. 55. A small tree, up to 50 ft. high in secondary forest growth ; petals greenish-yellow with thin red markings.
Port.G.: Cacine (July) *Esp. Santo* 2117 ! **Fr.G.:** Conakry (June) *Debeaux* 422 ! Kaba to Haut-Mamou (May) *Chev.* 13265 ! Massadou, Macenta (May) *Collenette* 23 ! **S.L.:** *Afzelius* ! *Smeathmann* ! *T. Vogel* 122 ! R. Bagroo (Apr.) *Mann* 864 ! Kahreni, Limba (Apr.) *Sc. Elliot* 5591 ! Njala (fl. May, fr. Oct.) *Deighton* 668 ! *Small* 125 ! **Lib.:** Gbanga (fl. & fr. Sept.) *Linder* 810 ! Ganta (May) *Harley* 1173 ! Butaw, Sinoe (Mar.) *Baldwin* 11490 ! **Iv.C.:** Mt. Momy, Dyolas (fr. Apr.) *Chev.* 21372 ! Toumodi, Baoulé-Sud (fr. Aug.) *Chev.* 22384 ! **G.C.:** Kumasi (Apr.) *Vigne* 1091 ! Ancobra (fr. Jan.) *Kitson* 1007 ! Obuasi (fr. June) *Andoh* FH 4213 ! **S.Nig.:** Aguku *Thomas* 885 ! Ekwulobia, Awka (fr. Nov.) *Ujor* FHI 15293 ! **Br.Cam.:** Kumba Dist. (fr. June) *Olorunfemi* FHI 30622 ! Also in French Cameroons. (See Appendix, p. 89.)

4. **PSOROSPERMUM** Spach—F.T.A. 1 : 158.

Lateral nerves not impressed above, leaves not bullate :

Leaves alternate or subopposite, rarely some opposite, not subsessile and not or only slightly acuminate :

Leaves coriaceous, oblong to obovate, 8–18 cm. long, 4–10·5 cm. broad ; stem and leaves entirely glabrous ; inflorescences appearing terminal and not usually exceeded by the lateral shoots ; flowers numerous in large corymbose-cymes ; petals pale purple .. .. 1. *alternifolium*

Leaves membranous or subcoriaceous, up to 14 cm. long and 6 cm. broad ; stem and leaves often hairy ; inflorescences usually exceeded by the lateral shoots ; petals white or cream, with dark streaks :

Suffrutex ; sepals 5 mm. long ; stems and leaves densely long-woolly tomentose ; leaves elliptic, 5–14 cm. long, 2·5–6 cm. broad .. .. .. 2. *lanatum*

Erect shrubs and trees :

Cymes appearing axillary, up to about 5 cm. diam., numerous, occurring at most of the nodes of the young shoots :

Leaves obtuse at apex, midrib straight ; mature branchlets and undersurface of leaves pubescent ; internodes usually shorter than the leaves ; cymes dense, subsessile or peduncles up to 1 cm. long .. .. .. 3. *senegalense*

Leaves acute at apex, midrib dorsiventrally arched ; branchlets and leaves quite glabrous except when very young, internodes usually as long as, or longer than, the leaves ; cymes lax, peduncle usually exceeding 1 cm. long 4. *glaberrimum*

Cymes not appearing axillary, exceeding 5 cm. diam., corymbose, terminating the main shoots, most nodes not floriferous ; peduncles exceeding 1 cm. long :

Inflorescence and outside of sepals densely woolly tomentose
5. *corymbiferum* var. *corymbiferum*

Inflorescence and outside of sepals sparingly pubescent or nearly glabrous
5a. *corymbiferum* var. *kerstingii*

Leaves always strictly opposite ; inflorescences usually appearing terminal, or terminating short lateral shoots :

Leaves distinctly acuminate, membranous ; petiole 4–8 mm. long ; lamina elliptic, cuneate at base, 5–11 cm. long, 2–5 cm. broad, lower surface concolorous, laxly and not conspicuously reticulate, punctate all over ; stems, leaves, inflorescences and outside of sepals glabrous .. .. 6. *tenuifolium*

Leaves scarcely acuminate, subcoriaceous, subsessile, or with petiole up to 3 mm. long, subcordate or rounded at base, sometimes cuneate ; gland dots usually absent from lower surface of leaves, reticulation where not obscured by indumentum, conspicuous owing to the pallid surface between the veins :

Inflorescence and outside of sepals sparingly pubescent or nearly glabrous ; leaves glabrous or sparingly pubescent, with the reticulate venation on the pallid lower surface obvious (at least when dry) ; leaves usually more or less oblong
7. *febrifugum* var. *febrifugum*

Inflorescence and outside of sepals woolly tomentose ; lower surface of leaves covered with stellate indumentum tending to obscure the reticulation ; leaves usually broadly ovate to orbicular .. 7a. *febrifugum* var. *ferrugineum*

Lateral nerves impressed above, leaves more or less bullate, elliptic, 3–7 cm. long, 1·5–3 cm. broad, strictly opposite ; inflorescences often terminating short lateral shoots :

Lamina of adult leaves densely punctate beneath, sparsely pubescent on the midrib and lateral nerves .. .. 8. *densipunctatum*

Lamina of adult leaves densely ferruginous tomentose beneath .. 9. *aurantiacum*

1. **P. alternifolium** *Hook. f.* in Fl. Nigrit. 243 (1849) ; F.T.A. 1 : 159 ; Chev. Bot. 50 ; Aubrév. Fl. For. Soud.-Guin. 146, t. 23, 3. Shrub, or small tree, to 12 ft. high, or suffrutescent ; flowers pale purple, often galled.
Fr.Sud.: Banfara (Mar.) *Chev.* 534 ! **Fr.G.**: *Farmar* 327*a* ! Various localities *fide* Chev. *l.c.* **S.L.**: Freetown *Don* ! Wossin Highlands *Sc. Elliot* 5051 ! Wallia, Buyabuya (Feb.) *Sc. Elliot* 4774 ! Kongobu (Mar.) *MacDonald* 26 ! Port Loko (Jan.) *Deighton* 1042 ! Madina (Feb.) *Glanville* 180 ! Makump (July) *Thomas* 979 ! Tepetuk (Apr.) *Jordan* 221 ! Bintumane, Loma Mts. (fr. Apr.) *Frith* 28 ! (See Appendix, p. 88.)

2. **P. lanatum** *Hochr.* in Ann. Conserv. Jard. Bot. Genèv. 21 : 59 (1919). *P. guineense* of F.W.T.A., ed. 1, 1 232, partly, not of Hochr. Suffrutex, with erect sparingly branched stems, to about 1½ ft. high.
Fr.G.: Kollangui (Mar.) *Chev.* 13512 ! Dalaba (Apr.) *Caille* 18158 ! Also in Uganda.

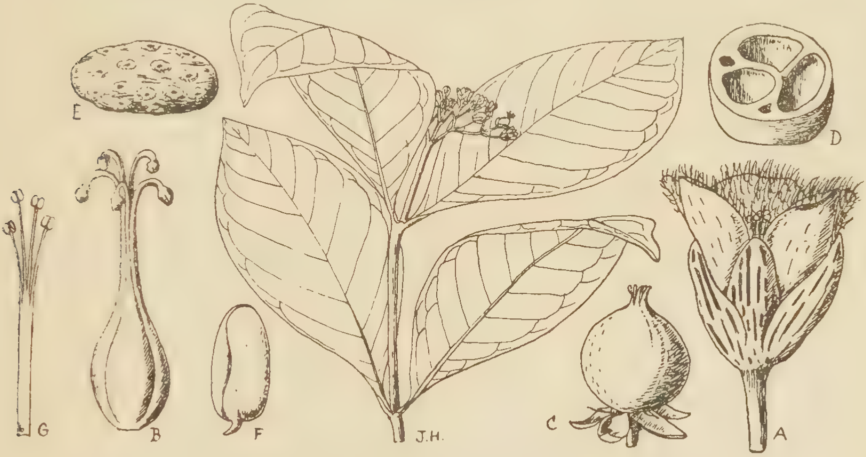

FIG. 110.—PSOROSPERMUM TENUIFOLIUM *Hook. f* (HYPERICACEAE).

A, flower. B, ovary with styles. C, fruit. D, cross-section of fruit. E, seed. F, embryo. G, bundle of stamens (more usually with 5–7 stamens). Mostly after Fitch.

3. **P. senegalense** *Spach* in Ann. Sci. Nat. Sér. 2, 5 : 164 (1836), excl. ref. Choisy and Linn. ; F.T.A. 1 : 158, partly (excl. spec. *Barter*). *Vismia guineensis* of Guill. & Perr. Fl. Seneg. 107, t. 23, not of (Linn.) Choisy. *P. guineense* Hochr. l.c. 57, partly (observation and syn. *P. senegalense* Spach) ; F.W.T.A., ed. 1, 1 : 232, partly. Shrub or small tree ; flowers white.
Sen.: *Perrottet* 91 ! **Gam.**: Albreda (May) *Leprieur* ! **Port. G.**: Pussubé (young fr. Feb.) *Esp. Santo* 1141 ! **S.L.**: *Hutton* !

4. **P. glaberrimum** *Hochr.* l.c. 63 (July 1919) ; Aubrév. l.c. 146, t. 23, 4. *P. tenuifolium* var. *laxiflorum* Engl. Bot. Jahrb. 17 : 85 (1893). *P. laxiflorum* (Engl.) Engl. Bot. Jahrb. 55 : 385 (August 1919) ; F.W.T.A., ed. 1, 1 : 232. *P. tenuifolium* of Chev. Bot. 51, partly, not of Hook. f. *P. umbellulatum* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 232 (1927) ; Kew Bull. 1928 : 226. Much-branched shrub, to 12 ft. high ; flowers white.
Gam.: Esso *Heudelot* 92*a* ! **Fr.G.**: Farana (Mar.) *Sc. Elliot* 5369 ! Ditinn (Apr.) *Chev.* 12949 ! **S.L.**: *Sc. Elliot* ! *Burbridge* 542 ! 545 ! Kamakuia (May) *Thomas* 267 ! Musaia (May) *Deighton* 4320 ! **Iv.C.**: Ferkéssédougou *Aubrév.* 1523. **Togo**: Bismarckburg (Nov.–Mar.) *Büttner* 431 ! **Dah.**: Djougou (May) *Chev.* 23841.

5. **P. corymbiferum** *Hochr.* var. **corymbiferum**—in Ann. Conserv. Jard. Bot. Genèv. 21 : 58 (July 1919). *P. senegalense* of F.T.A. 1 : 158, partly (spec. *Barter*). *P. guineense* of F.W.T.A., ed. 1, 1 : 232, partly ; of Aubrév. Fl. For. Soud.-Guin. 146, t. 23, 2, partly ; not of (Linn.) Hochr. Savannah shrub, or tree, to 15 ft. high ; flowers cream, ripe fruits purple.
Gam.: *Whitfield* ! **Fr.G.**: Fouta Djalon *Heudelot* 768 ! Kouroussa *Pobéguin* 212 ! **Fr.Sud. & Iv.C.**: *fide* Aubrev. *l.c.* **G.C.**: Gambaga (fr. May) *Vigne* 3858 ! **N.Nig.**: Sokoto (Dec.) *Lely* 854 ! Kontagora (Feb.) *Dalz.* 79 ! Zaria (Mar.) *Weir* 26 ! Anara F.R. (Mar.) *Olorunfemi* FHI 24417 ! Nupe *Barter* 1203 ! Bauchi Plateau (Mar.) *Lely* P. 178 ! **S.Nig.**: Lagos Colony *Rowland* ! Olokemeji (Mar.) *Meikle* 1299 ! *Foster* 291 ! Oyo (Mar.) FHI 20531 ! Also in Uganda.
[*Esp. Santo* 2465 from Farim, Port. G., is somewhat intermediate between this variety and *P. senegalense* Spach.]

5a. **P. corymbiferum** var. **kerstingii** (*Engl.*) *Keay & Milne-Redhead* in Kew Bull. 1953 : 291. *P. kerstingii* Engl. Bot. Jahrb. 55 : 384 (August 1919) ; F.W.T.A., ed. 1, 1 : 231. *P. ledermannii* var. *doeringii* Engl. l.c.. 387. *P. thompsonii* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 232 (1927) ; Kew Bull. 1928 : 226. Savannah shrub, or tree, to 15 ft. high ; flowers cream.
Iv.C.: *Serv. For.* 1883 ! **G.C.**: Drobo, Ashanti (fr. Apr.) *Thompson* 64 ! Tamale *Williams* 148 ! Binduri (Apr.) *Vigne* 4694 ! **Togo**: Misahöhe (Apr.) *Baumann* 568 ! Kratchi *Anderson* 40 ! Basari (Dec.–Feb.) *Kersting* 71 ; 597. Atakpame (fr. Apr.) *Doering* 220. Kpedji (fl. & fr. May) *Doering* 13. **N.Nig.**: Wonnaka, Gusau (fr. May) *Ogbe* FHI 15820 ! Samaru, Zaria (Mar.) *Hubbard* T. 48 ! T. 56 ! Anara F.R. (fl. & fr. May) *Keay* FHI 22966 ! **S.Nig.**: Lagos Colony *Rowland* ! (See Appendix, p. 89.)

6. **P. tenuifolium** *Hook. f.* in Fl. Nigrit. 242, t. 21 (1849); F.T.A. 1: 159. A shrub, much-branched, to 10 ft. high; in swamp forest, often near the coast; petals greenish-white; fruits plum-coloured.
S.Nig.: Lagos (Sept.) *Dalz.* 989! Eba Isl. (July) *Kennedy* 1706! Akassa, Nun R. (Aug.) *T. Vogel* 23! 43! *Mann* 459! Brass *Barter* 1865! Calabar (fl. & fr. Mar.) *Thomson* 133! *Brenan* 9219! **Br.Cam.:** Asu R., Bamenda (Mar.) *Johnstone* 286! Also in French Cameroons and Belgian Congo.

7. **P. febrifugum** *Spach* var. **febrifugum**[1]—in Ann. Sci. Nat. Sér. 2, 5: 163 (1836); F.T.A. 1: 158, partly (as to var. *glabrum* and var. *albidum*); Aubrév. l.c. 146 (as to aggregate species). *P. campestre* Engl. Bot. Jahrb. 17: 84 (1893); F.W.T.A., ed. 1, 1: 231. *P. baumannii* Engl. l.c. 382 (1919); F.W.T.A., ed. 1, 1: 232. *P. microphyllum* A. Chev. Bot. 51. *P. floribundum* Hutch. & Dalz. F.W.T.A., ed. 1, 1: 232 (1927). Savannah tree, or shrub, to 12 ft. high, with smooth grey bark; flowers cream; fruits red.
S.L.: *Afzelius*! Freetown (fr. Apr.) *Deighton* 4756! **Iv.C.:** Mt. Zan, Dyolas (May) *Chev.* 21568. Gouékouma (May) *Chev.* 21676. **G.C.:** Kwalu Tafo (fr. Apr.) *Kitson* 1053! 1060! Mampong (fr. May) *Kitson* 517! Saku (May) *Vigne* 4702! **Togo:** Agome Mts. (Mar.) *Baumann* 22! **N.Nig.:** Patti Lokoja (Apr.) *Elliott* 45! **S.Nig.:** Lagos (Dec.) *Barter* 2187! *Millen* 57! *Foster* 66! Sobo Plains (fl. Mar., fr. Sept.) *Jones* FHI 7450! *Butler-Cole* 1! Onitsha *Barter* 1652! Udi *Kennedy* 3149! Enugu (May) *Jones* FHI 6563! Widespread in tropical Africa. (See Appendix, p. 88.)

7a. **P. febrifugum** var. **ferrugineum** (*Hook. f.*) *Keay & Milne-Redhead* in Kew Bull. 1953: 290. *P. ferrugineum* Hook. f. in Fl. Nigrit. 241 (1849). *P. febrifugum* of F.T.A. 1: 158, partly (excl. var. *glabrum* and var. *albidum*); Aubrév. l.c. 146 (as to t. 23, 1). *P. febrifugum* of F.W.T.A., ed. 1, 1: 232. Savannah shrub or small tree, to 12 ft. high; flowers cream; fruits red.
Fr.G.: Konkouré *Pobéguin* 1942! **S.L.:** *Afzelius*! Freetown *Don*! Falaba (Mar.) *Sc. Elliot* 5219! 5441! Kaballa (fr. Sept.) *Thomas* 2238! Musaia (Apr.) *Deighton* 5452! **N.Nig.:** Vom *Dent Young* 15! Naraguta (Apr.) *Kennedy* FHI 7216! Bauchi Plateau (Mar.) *Lely* P. 178! **Br.Cam.:** Bafring (Feb.) *Johnstone* 36/31! Widespread in tropical Africa. (See Appendix, p. 88.)

8. **P. densipunctatum** *Engl.* Bot. Jahrb. 55: 385 (1919). Shrub or small tree, to 10 ft. high, in mountain grassland and forest edges; leaves dark glossy green; flowers white or yellowish; fruits red.
Br.Cam.: Bamenda Prov.: Lakom, 6,000 ft. (Apr.) *Maitland* 1662! Basenako, 5,000 ft. (June) *Maitland* 1680! Bafut-Ngemba F.R. (Apr.) *Ujor* FHI 30019! *Lightbody* FHI 26341! Kumbo (fr. Apr.) *Ejiofor* FHI 30081! Also in French Cameroons.

9. **P. aurantiacum** *Engl.* l.c. 55: 383 (1919). Tree, to 15 ft. high, in mountain grassland and forest; leaves rusty tomentose; petals cream.
S.Nig.: Ikwette Plateau, 5,000 ft. (Dec.) *Keay & Savory* FHI 25229! **Br.Cam.:** Bamenda *Lightbody*! L. Bambulue (fl. & fr. Apr.) *Johnstone* 305/32! Ndu, Bamenda (fr. May) *Johnstone* 108/31! Also in French Cameroons.

5. **HARUNGANA** Lam. Tab. Encyc. Méth. Bot. t. 645 (1797). *Haronga* Thouars (1806) —F.T.A. 1: 159.

A tree or shrub, with orange-coloured sap, clothed everywhere with fine stellate hairs; leaves opposite, ovate or ovate-elliptic, rounded, or sometimes cuneate or subcordate at base, acute or shortly acuminate at apex, 10–20 cm. long, 6–10 cm. broad, with rather numerous lateral nerves prominent beneath; petiole 1·5–2 cm. long; flowers very small and numerous in a terminal corymbose cyme, its branches covered with coarse rusty indumentum .. .. *madagascariensis*

H. madagascariensis *Lam. ex Poir.* in Lam. Encyc. Méth. 6: 314 (1804); Exell in J. Bot. 68: 181 (1930). *Arungana paniculata* Pers. (1806). *Haronga madagascariensis* (Lam. ex Poir.) Choisy (1821)—F.T.A. 1: 160; Chev. Bot. 51. *Haronga paniculata* Lodd. ex Steud. (1840)—F.W.T.A., ed. 1, 1: 233. Flowers whitish, fragrant, dotted with black glands; drupes 2–4 seeded, 2·5–3·5 mm. diam.; abundant on cleared ground in forest regions, also in fringing forest in the savannah regions.
Sen.: Casamance (Jan., Feb.) *Chev.* 2726; 2728. **Gam.:** Albreda (fr. Mar., Apr.) *Perrottet*. **Fr.Sud.:** Kita *Dubois* 208! **Fr.G.:** *Heudelot* 598! Kouroussa (Aug.) *Pobéguin* 429! Kissossa (July) *Pobéguin* 786! Kouria (Aug.) *Chev.* 14892! **S.L.:** *Barter*! Regent (Dec.) *Sc. Elliot* 4005! Freetown (July) *Deighton* 5! Kambaia (Oct.) *Small* 473! **Lib.:** Sinoe Basin *Whyte*! Gbanga (Oct.) *Linder* 1235! Ganta *Harley*! Vonjama (Oct.) *Baldwin* 9888! **Iv.C.:** Assikasso (Dec.) *Chev.* 22611! **G.C.:** Kumasi *Cummins* 101! Boankra (May) *Chipp* 436! Half Assinie (July) *Chipp* 298! Tarkwa (July) *Vigne* 916! **Togo:** Misahöhe *Baumann* 454! Aledja *Kersting* A. 208! **N.Nig.:** Birnin Gwari (Nov.) *Thornewill* 152! Naraguta (Aug.) *Lely* 493! **S.Nig.:** Lagos *Barter* 2089! *Dalz.* 1068! Benin *Dennett* 31! Onitsha *Unwin* 80! Oban *Talbot* 540! Calabar (Feb.) *Mann* 2287! **Br.Cam.:** Cam. Mt., 2,500–4,000 ft. (Nov.–Jan.) *Mann* 1183! *Maitland* 245! Babanki, Bamenda, 4,500 ft. (June) *Maitland* 1719! **F.Po:** *T. Vogel* 100! *Barter* 1255! *Mann* 637! Moka (Dec.) *Boughey* 81! Widespread in tropical Africa, Madagascar and the Mascarene Islands. (See Appendix, p. 87.)

72. GUTTIFERAE

Trees or shrubs, with resinous juice. Leaves opposite, simple; stipules absent. Flowers actinomorphic, unisexual, polygamous or dioecious, rarely hermaphrodite. Sepals 2–6, rarely more, imbricate. Petals the same number, hypogynous, contorted or imbricate, very rarely subvalvate. Stamens mostly numerous, hypogynous, free or variously united in the lower part or into bundles opposite the petals; anthers 2-celled, opening lengthwise. Rudimentary ovary sometimes present in the male flower; staminodes often present in the female flower. Ovary sessile, superior, 1- to many-celled; ovules 1 to many, on the inner angle of the cells or erect from their base, rarely parietal (*Allanblackia*); stigmas various, sometimes radiating. Fruit dehiscent or not, sometimes large and globose. Seeds often with an aril, without endosperm ; embryo large ; cotyledons often minute.

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[1] Note that the specimens cited here under the two varieties show considerable variation from the types of these varieties. A specimen from Bamenda (*Ujor* FHI 30042) resembling var. *ferrugineum* shares certain characters with *P. densipunctatum*; both species occur in Bamenda. A specimen from R. Oji, Nigeria (*Kitson* s.n.) appears to be intermediate between this species and *P. tenuifolium*. Another specimen (*Irvine* 3615 from Enugu, Nigeria) has the leaf-shape of var. *ferrugineum* but is glabrous as var. *febrifugum* except for the pedicels and calyx which are hairy but rather less so than var. *ferrugineum*.

A tropical family recognized by the opposite entire leaves without stipules, unisexual flowers with the stamens mostly collected into bundles, imbricate calyx, and resinous juice.

Ovary 1-celled, with numerous ovules on 5 parietal placentas ; stamens united into 5 cuneate-spathulate bundles opposite the petals ; anthers subsessile ; flowers unisexual, large ; fruit large, elongate .. .. 1. **Allanblackia**

Ovary 2- or more-celled with axile placentas :

Flowers hermaphrodite ; ovules 3 or more in each cell :

Flowers large, terminal, solitary ; inner sepals nearly as large as the petals ; stamens numerous, shortly connate into 5 bundles, and filaments free above : fruit large and ovoid or subglobose .. .. 2. **Pentadesma**

Flowers small, umbellate ; sepals much smaller than the petals and exposing them in bud ; stamens about 15, connate nearly to the anthers in 5 bundles ; fruit a small berry .. .. 3. **Symphonia**

Flowers hermaphrodite or polygamous ; ovary 2-celled with 2 ovules in each cell ; stamens numerous, connate only near the base ; filaments slender ; stigma subsessile, capitate .. .. 4. **Mammea**

Flowers polygamous or dioecious ; ovary 2- or more-celled, with a solitary ovule in each cell ; stamens free or variously united into bundles ; fruits usually rather small ; leaves often punctate or with resinous lines oblique to the lateral nerves 5. **Garcinia**

Besides the above indigenous genera, the following have been introduced into our area :—*Calophyllum inophyllum* Linn., and *Mesua ferrea* Linn.

1. ALLANBLACKIA Oliv.—F.T.A. 1 : 162.

Fruit fusiform, 25–50 cm. long, 8–14 cm. diam., with 40–80 seeds about 2–4 cm. long and 1·5–2·5 cm. broad ; flowers pink or red, the male crowded towards the apex of the branches, with pedicels 2·5–7 cm. long ; disk of male flower pitted or pleated ; leaves varying from broadly oblong-elliptic to oblong-oblanceolate, cuneate or rounded at base, acutely acuminate, 10–25 cm. long, 3·5–8 cm. broad 1. *floribunda*

Fruit ovoid to subglobose, 12–16 cm. long, 10–12 cm. diam., with 10–12 seeds about 4·5 cm. long and 3–3·5 cm. broad ; flowers white or pale pink, disk of male flower smooth or only slightly pleated ; pedicels 3–6 mm. long ; leaves obovate, oblanceolate or oblong-lanceolate, cuneate at base, cuspidate at apex, 6–12 cm. long, 2·5–5 cm. broad .. .. 2. *monticola*

1. **A. floribunda** *Oliv.* F.T.A. 1 : 163 (1868) ; Chev. Bot. 52 ; Staner in Bull. Jard. Bot. Brux. 13 : 114 (1934). *A. parviflora* A. Chev. Vég. Util. 5 : 163 (1909) ; Chev. Bot. 53 ; F.W.T.A., ed. 1, 1 : 233 ; Aubrév. Fl. For. C. Iv. 2 : 286, t. 240. Evergreen tree of forest, to 100 ft. high.
S.L.: Jama (May) *Lane-Poole* 98 ! Banduma, Daru (Apr.) *Deighton* 3142 ! **Lib.:** Dukwia R. (Mar.) *Cooper* 325 ! Nyaake, Webo (young fr. June) *Baldwin* 6132 ! Ganta (fl. May, fr. Apr.) *Harley* 1134 ! 1182 ! **Iv.C.:** Erymakouié (fl. & fr. Jan.) *Chev.* 16161. Alépé (Mar.) *Chev.* 16239. Azaguié *Chev.* B. 22356 ! **G.C.:** Axim (fl. June, fr. Nov.) *Chipp* 20 ! 251 ! Beyin (July) *Chipp* 263 ! Ashanti (Apr.) *Vigne* 1082 ! Suku (Feb.) *Brent* 9 DD ! Imbraim (Mar.) *Thompson* 20 ! **Dah.:** Sakété (Jan.) *Chev.* 22858 ! **S.Nig.:** Ijebu-Ode (Apr.) *Gilman* 521 ! Benin City *Dennett* 32 ! Ezi (Feb.) *Thomas* 2331 ! Degema (Oct.) *King-Church* 47 ! *Talbot* 3661 ! 3687 ! Oban *Talbot* 1335 ! 1337 ! **Br.Cam.:** Cameroons R. (Jan.) *Mann* 2193 ! Also in French Cameroons, Gabon, Belgian Congo, Cabinda and Uganda. (See Appendix, p. 89.)
2. **A. monticola** *Mildbr. ex Engl.* Pflanzenw. Afr. 3, 2 : 509 (1921) ; Staner l.c. 111. Forest tree.
F.Po: north side of St. Isabel peak, 1,900–2,900 ft. *Mildbr.* 6430. Also in Belgian Congo.

Imperfectly known species.

A. sp. Represented by only a poor specimen, but evidently distinct from *A. floribunda* Oliv., and probably also from *A. monticola* Mildbr. ex Engl. Better material required.
Br.Cam.: Bali-Ngemba F.R., Bamenda (May) *Ujor* FHI 30327 !

2. PENTADESMA Sabine—F.T.A. 1 : 164.

Leaves oblong-obovate to oblong-oblanceolate, cuneate at base, shortly acuminate, 10–22 cm. long, 3·5–7 cm. broad, with numerous close parallel lateral nerves ; glandular canals on undersurface visible by reflected light, glandular dots clearly visible in young and sucker leaves by transmitted light ; pedicels about 2·5 cm. long, stout, flowers nodding ; sepals very unequal, the inner as large as the petals, up to about 5 cm. long ; ovary gradually narrowed into the elongated style which is divided into 5 linear spreading lobes ; fruits broadly ellipsoid, pointed, about 15 cm. long and 10 cm. broad ; seeds large with flattened sides .. .. *butyracea*

P. butyracea *Sabine*—F.T.A. 1 : 164 ; Chev. Bot. 52 ; Aubrév. Fl. For. C. Iv. 2 : 282, t. 237. *P. leucantha* A. Chev. Vég. Util. 5 : 166 (1909) ; Chev. Bot. 52. *P. nigritiana* Bak. f. in Cat. Talb. 7 (1913) ; F.W.T.A., ed. 1, 1 : 235. *P. grandifolia* Bak. f. l.c. 8 (1913) ; F.W.T.A., ed. 1, 1 : 235. *P. kerstingii* Engl. Bot. Jahrb. 55 : 396 (1919) ; Chev. Bot. 52. Forest tree, to 75 ft. high ; flowers white, cream or greenish-white. [N.B.—there is no evidence of their ever being red as stated in ed. 1] ; sepals persistent at the base of the fruit ; seeds 3–10 embedded in a yellowish pulp. The yellow latex from the incised bark dries like gamboge.
Fr.G.: Conakry (cult.) *Farmar* 316 ! Nzérékoré (Oct.) *Baldwin* 9698 ! Kindia *Chev.* 13102. **S.L.:** *Cole* !

Freetown *Don* ! Rotomba Isl. (fr. Mar.) *Kirk* 14 ! Fulawun (Apr.) *Deighton* 1629 ! Njala (Sept.) *Small* 194 ! **Lib.:** Dukwia R. (fl. Feb., fr. Oct.) *Cooper* 80 ! 273 ! 379 ! Tappita (Aug.) *Baldwin* 9068 ! **Iv.C.:** Aboisso (Aug.) *Chev.* 16290 ! **G.C.:** Suku Suku (Oct.) *Brent* 5 ! Simpa *Andoh* FH 3256 ! **Togo:** Sokodé (Mar., Oct.) *Kersting* 15 ; 452. Atakpame (fr. May) *Doering* 238. **Dah.:** Atacora Mts. *Chev.* 24169 ! **N.Nig.:** Agaie (Oct.) *Yates* ! **S.Nig.:** Lagos *Millen* 113 ! Eba (Oct.) *Sankey* ! Nun R. (fl. & fr. Sept.) *Mann* 483 ! Oban *Talbot* 1742 ! **Br.Cam.:** Malende (Apr.) *Ejiofor* FHI 29364 ! (See Appendix, p. 93.).

Other species are recorded from the French Cameroons, Gabon and Belgian Congo, but some at least of them are probably not distinct from *P. butyracea* Sabine.

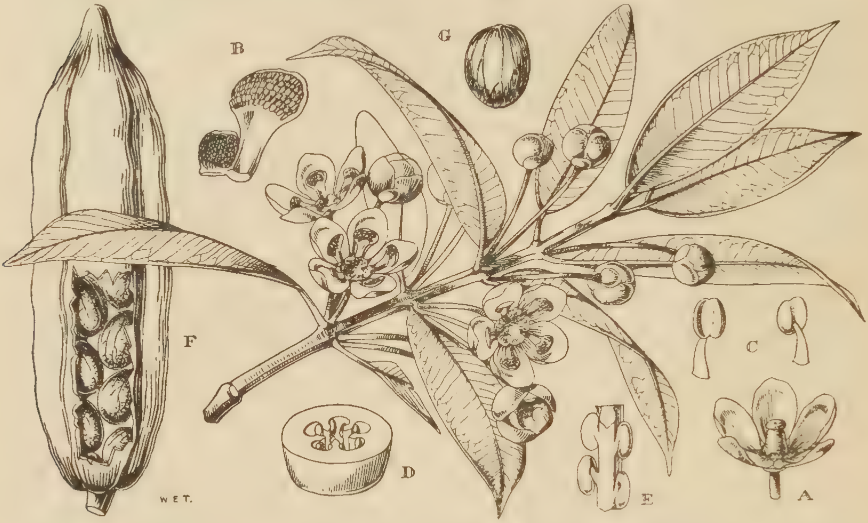

FIG. 111.—ALLANBLACKIA FLORIBUNDA *Oliv.* (GUTTIFERAE).

A, flower with stamens removed. B, bundle of stamens and a lobe of the central disk (rudimentary ovary) in male flower. C, stamens, front and back. D, cross-section of ovary. E, portion of placenta with ovules. F, fruit. G, seed with aril.

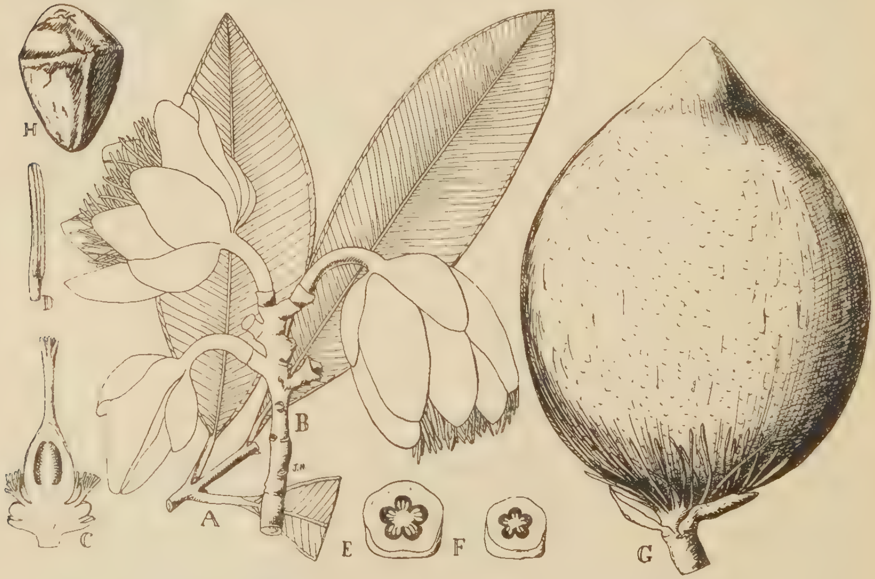

FIG. 112.—PENTADESMA BUTYRACEA *Sabine* (GUTTIFERAE).

A, leaves. B, flowers. C, vertical section of ovary. D, anther. E, F, sections of ovary. G, fruit. H, seed.

3. SYMPHONIA Linn. f.—F.T.A. 1 : 163.

A glabrous tree ; leaves elliptic-oblanceolate, obtusely acuminate, cuneate at the base, 8–10 cm. long, 2–3 cm. broad, with numerous rather close parallel lateral nerves ;

petiole about 0·5 cm. long ; flowers red to deep crimson, rather densely clustered on short lateral shoots, about 6–7 mm. long ; fruits ellipsoid to depressed-globose, about 2·5 cm. in diam. ; seeds one or few, large, with flattened sides .. .. *globulifera*

S. globulifera *Linn. f.*—F.T.A. 1 : 163 ; Staner in Bull. Jard. Bot. Brux. 13 : 143 (1934) ; Aubrév. Fl. For. C. Iv. 2 : 284, t. 238. *S. globulifera* var. *gabonensis* Vesque in DC. Monogr. 8 : 231 (1893) ; Chev. Bot. 52. *S. gabonensis* (Vesque) Pierre in Bull. Soc. Linn. Paris 2 : 1228 (1897) ; F.W.T.A., ed. 1, 1 : 235, incl. var. *macrantha* Hutch. & Dalz. A tree, up to 80 ft. high ; bole straight, with a crown of short horizontal branches ; common in muddy forest-swamps and by streams.

S.L.: Falaba (Apr.) *Aylmer* 55 ! Bo to Tinkonko (June) *King* 251 ! **Lib.:** Dukwia R. (fl. Feb., fr. Oct.) *Cooper* 105 ! 333 ! Logantown, New Cess R. (Mar.) *Baldwin* 11183 ! **Iv.C.:** Dabou (Feb.) *Chev.* 16198 . **G.C.:** Aburi (July) *Johnson* 913 ! Axim (Feb.) *Irvine* 2373 ! **S.Nig.:** Lagos (fl. & fr. Jan.) *Millen* 131 ! *Dalz.* 1267 ! Epe *Barter* 3255 ! R. Oni *Sankey* 4 ! Calabar (Feb.) *Mann* 2279 ! Oban *Talbot* 220 ! **Br.Cam.:** Ambas Bay (fl. & fr. Feb.) *Mann* 761 ! Likomba (Oct.) *Mildbr.* 10542 ! Njinikom (May) *Johnstone* 14 ! Also in French Cameroons, Gabon, Belgian Congo, Uganda, Angola, S. Tomé, and in tropical America. (See Appendix, p. 94.)

4. **MAMMEA** Linn. Gen. Pl. ed. 1, 344 (1737).

A large tree ; leaves oblong-elliptic, shortly cuneate at the base, rather abruptly acuminate, 15–25 cm. long, 6–9 cm. broad, with numerous lateral nerves and reticulate on both surfaces ; petiole about 2 cm. long ; flowers solitary or few ; pedicels about 3 cm. long ; calyx closed in bud, opening into 2 or 3 segments about 1·5 cm. long ; petals slightly longer than the calyx ; fruit globose-obovoid, about 7 cm. or more long, finely warted ; seeds 5 cm. long, with fibrous coat .. *africana*

M. africana *Sabine* in Trans. Hort. Soc. 5 : 457 (1824) ; Staner in Bull. Jard. Bot. Brux. 13 : 101 (1934) ; Aubrév. Fl. For. C. Iv. 2 : 284, t. 239. *Ochrocarpus africanus* Oliv. F.T.A. 1 : 169 (1868) ; Chev. Bot. 55 ; F.W.T.A., ed. 1, 1 : 235. *Garcinia golaensis* Hutch. & Dalz. F.W.T.A., ed. 1, 1 : 237 (1927) ; Kew Bull. 1928 : 228. A forest tree, 50–100 ft. high ; bark often yellow, with pale scales, and with resinous yellow sap ; fruit orange-coloured, commonly with 3 large seeds in a yellowish pulp.

S.L.: Freetown, on the mountain *Afzelius.* Gola (fr. Jan.) *Unwin & Smythe* 67 ! **Lib.:** Dukwia R. (fr. Feb., Oct.) *Cooper* 85 ! 223 ! **Iv.C.:** Yapo (Sept.) *Chev.* 22332 ! **G.C.:** Dunkwa (Jan.) *Vigne* 943. Akumadan (Oct.) *Vigne* 2556 ! Agogo *Irvine* 579 ! **S.Nig.:** Sapoba (Oct.) *Kennedy* 1680 ! *A. F. Ross* 211 ! Ahoada (Sept.) *King-Church* 43 ! **Br.Cam.:** Likomba (Nov.) *Mildbr.* 10610 ! Also in Principé, Cabinda and Belgian Congo. (See Appendix, p. 92.)

M. americana Linn. has been introduced from tropical America and is cultivated in various localities within our area.

5. **GARCINIA** Linn.—F.T.A. 1 : 164.

Stamens free ; leaves in whorls of 3, obovate or elliptic, cuneate to rounded at base, rounded and mucronate at apex, 5–12 cm. long, 2–6 cm. broad ; flowers with pedicels 1–2 cm. long, in axillary fascicles on the older twigs .. .. 1. *livingstonei*

Stamens variously united in bundles ; leaves in pairs :

Branchlets winged or very sharply 4-angled ; leaves with tertiary nerves and veins obscure beneath ; flowers numerous in terminal umbellate racemes, the axis 1–4 cm. long, tetragonous, densely covered by the bracts, and, in later stages, by scars of fallen pedicels ; stamens in 5 narrow bundles of 6–10 stamens ; filaments shortly free above ; fruits verrucose :

Leaves rounded at base, broadly elliptic, abruptly acuminate, 10–15 cm. long, 6–8 cm. broad ; lateral nerves about 8, spreading ; fruit broadly ellipsoid, acute at each end, about 4 cm. long, 3 cm. broad .. .. 2. *granulata*

Leaves cuneate at base, oblong-elliptic gradually acuminate or acute, 12–24 cm. long, 4·5–9 cm. broad ; lateral nerves 8–14, making an acute angle with the midrib towards the base ; fruit obovoid or ellipsoid, up to 4·5 cm. long and 4 cm. broad ; usually 2-seeded .. .. 3. *gnetoides*

Branchlets terete or only slightly angular ; fruits usually smooth, or rarely verrucose (*G. elliotii*) ; stamens in 4 bundles ; flowers in few-flowered cymes or in axillary fascicles :

Sepals and petals densely puberulous outside ; stamens in 4 narrow bundles of 15–20 stamens ; anthers subsessile ; fruits subglobose or ovoid, 5–9 cm. diam., with 2–4 ellipsoid seeds, 3–3·5 cm. long and about 1·5 cm. broad, embedded in copious pulp ; leaves broadly elliptic, cuneate to rounded at base, acute or shortly acuminate, 6–14 cm. long, 2–6 cm. broad, shining on both surfaces ; 10–15 pairs of lateral nerves prominent on both surfaces, with very obscure venation between ; petiole puberulous .. .. 4. *kola*

Sepals and petals glabrous outside ; petioles not puberulous :

*Filaments free above ; anthers spherical or ovoid ; flowers unisexual or hermaphrodite in axillary fascicles :

Leaves subsessile, subcordate and sometimes amplexicaul at base, oblong-elliptic, shortly acuminate, 15–25 cm. long, 6–10 cm. broad, with about 15 pairs of lateral nerves, laxly reticulate ; male flowers in fascicles on the older branches ; pedicels 2·5–5 cm. long .. .. 5. *staudtii*

Leaves distinctly petiolate, usually narrowed at base, not subcordate or amplexicaul :

Fruits densely verrucose, ellipsoid, 2·5 cm. long, 1·5 cm. broad ; flowers in axillary fascicles ; stamens in bundles of 5–7 stamens ; leaves oblong or oblong-elliptic, subacute at base, very shortly and obtusely acuminate, 9–16 cm. long, 3–6 cm. broad .. .. 6. *elliotii*

Fruits smooth :

Stamens 6–10 (or more) in each bundle ; flowers in axillary fascicles of 5–30 flowers ; pedicels 1·5–4·5 cm. long ; leaves oblong-elliptic, or oblong-ovate, or oblong-lanceolate, or oblanceolate, rounded to cuneate at base, acute or shortly acuminate at apex, 12–30 cm. long, 4·5–12 cm. broad, reticulate on both surfaces ; fruits subglobose, about 2 cm. diam. .. 7. *polyantha*

Stamens 3 in each bundle ; flowers in small dense axillary fascicles ; pedicels up to 7 mm. long ; leaves lanceolate to elliptic-lanceolate, gradually narrowed to an obtuse apex, 5–15 cm. long, 1·2–4·5 cm. broad, coriaceous, (elliptic to obovate-elliptic, distinctly acuminate, 6–15 cm. long, 2·5–5 cm. broad, papery —in a rain forest tree, see note below) ; fruits subglobose, about 1·5 cm. diam. 8. *ovalifolia*

*Filaments completely fused into 4 bundles, with oblong anthers sessile on the top of each bundle ; flowers unisexual, in axillary and terminal few-flowered cymes :

Leaves with glandular dots and dashes, lateral nerves very numerous and close without intermediate nerves ; lamina oblong-elliptic, shortly cuneate at base, caudate and obtusely acuminate, 6–10 cm. long, 2–5 cm. broad ; pedicels up to 1 cm. long ; flower buds about 5 mm. long .. .. .. 9. *punctata*

Leaves with long glandular canals, but lacking glandular dots and dashes :

Anthers transversely septate :

Staminal bundles united at base, about equal to the rudimentary ovary in length ; petals coriaceous ; leaves elliptic, cuneate at base, abruptly caudate-acuminate, 7–12 cm. long, 2·5–6 cm. broad ; lateral nerves very numerous and close .. .. 10. *mannii*

Staminal bundles free, much longer than the rudimentary ovary ; petals thin :

Lateral nerves 10–15, with much less prominent secondary nerves and veins between ; lamina obovate or obovate-oblong, cuneate at base, acuminate at apex, 9–14 cm. long, 3–6·5 cm. broad, bright green when dry, papery 11. *brevipedicellata*

Lateral nerves very numerous and close, more or less equally prominent ; lamina elliptic, cuneate at base ; acuminate or acute at apex, 7–14 cm. long, 3–6 cm. broad .. .. 12. *afzelii*

Anthers not septate ; otherwise as above .. .. .. 13. *epunctata*

1. **G. livingstonei** *T. Anders.*—F.T.A. 1 : 165 ; Aubrév. Fl. For. Soud.-Guin. 148, t. 24. *G. baikieana* Vesque in DC. Monogr. 8 : 336 ; Chev. Bot. 53 ; F.W.T.A., ed. 1, 1 : 236. *G. baikieana* var. *togoensis* Engl. (1908). Shrub or branching tree to 50 ft. high, with dark foliage ; petals white ; fruits yellow or red ; by streams and rivers in savannah country.
Fr.Sud.: Sansanding (Sept.) *Chev.* R. Niger, Keniegue (fr. Jan.) *Chev.* 276. **Fr.G.:** R. Niger, Farana *Sc. Elliot* 5338 ! *Chev.* 20460 ! **Iv.C.:** Léo *Aubrév.* 2689. **G.C.:** Pong (fr. Mar.) *Kitson* 871 ! R. Volta Aveyeme (fr. Apr.) *A. S. Thomas* 28 ! **Togo:** R. Oti, Possau (Dec.) *Kersting* A. 235. **N.Nig.:** Nupe *Barter* 848 ! Widespread in tropical Africa. (See Appendix, p. 90.)

2. **G. granulata** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 236 (1927) ; Kew Bull. 1928 : 227. Small tree ; fruit green, finely granular-verrucose.
S.L.: Gola (fr. Jan.) *Unwin & Smythe* 58 ! Kambui F.R. (Oct.) *Edwardson* 135 !
[Very close to, and perhaps not specifically distinct from the next.]

3. **G. gnetoides** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 236 (1927) ; Kew Bull. 1928 : 227 ; Aubrév. Fl. For. C. Iv. 2 : 288, t. 241, 1–4. *Xanthochymus quadrifarius* A. Chev. Bot. 54, not of Oliv. *G. densivenia* of F.W.T.A., ed. 1, 1 : 236, not of Engl. Forest tree, to 50 ft. high ; flowers white ; fruit orange.
Lib.: Bobei Mt., Sanokwele (Sept.) *Baldwin* 9581 ! 9605 ! **Iv.C.:** *Chev.* 15157 ! Yapo *Aubrév.* 595 ; 589. Mt. Nimba *Aubrév.* 1145. **G.C.:** Suku Suku (Nov.) *Chipp* 14 ! R. Bonsa, Piaso *Vigne* 222 ! R. Ancobra, Axim (fr. Mar.) *Irvine* 2380 ! **S.Nig.:** Omo F.R. *Tamajong* FHI 16920 ! Ikom *Catterall* 11 ! Oban *Talbot* 229 ! (See Appendix, p. 90.)

4. **G. kola** *Heckel* in Journ. Pharm. et Chim. 8 : 88 (1883) ; Staner in Bull. Jard. Bot. Brux. 13 : 120 ; Aubrév. l.c. 2 : 290, t. 241, 5–10. *G. dinklagei* Engl. Bot. Jahrb. 40 : 56 (1908). *G. conrauana* Engl. l.c. 562, partly. A forest tree, reaching 90 ft. ; flowers greenish-white with a reddish indumentum ; fruits reddish-yellow, the size of an orange, with orange-yellow, or reddish pulp ; seed-coat brown with branched lines, the kernels pale and penetrated with pockets of resin.
S.L.: Gola Forest (fr. Jan.) *Unwin & Smythe* 50 ! **Lib.:** Grand Bassa (Feb.) *Dinklage* 1612 ! Dukwia R. (Feb.) *Cooper* 216 ! **Iv.C.:** Agboville *Aubrév.* 1484. Banco *Aubrév.* 1641 ; 1720. Rasso *Aubrév.* 1768. **Dah.:** Porto Novo *Chev.* 22722 ! **S.Nig.:** Lagos *Melton* ! Okomu F.R. *Brenan* 8547 ! Degema *Talbot* 3809 ! Uwet (fr. Feb.) *Macleod* ! Umu-Akpo (Dec.) *Rosevear* 28/28 ! Also in French Cameroons, Gabon and Belgian Congo. (See Appendix, p. 91.)

5. **G. staudtii** *Engl.* Bot. Jahrb. 40 : 558, t. 1, A–D (1908). A forest shrub or tree, up to about 40 ft.
S.Nig.: *Rosevear* 6/30 ! Oban *Talbot* 1588 ! Ikom (Jan.) *Catterall* 18 ! Also in French Cameroons.

6. **G. elliotii** *Engl.* l.c. 571 (1908). Shrub, 2 ft. high, or more ; fruit 2-seeded, the seed-coat marked with prominent pale branching lines.
S.L.: *Thomas* 10113 ! Makunde *Sc. Elliot* 5709 ; 5709*b* ! Kassa (fr. Mar.) *Sc. Elliot* 5094 ! Njala (fr. Apr.) *Deighton* 2637 !

7. **G. polyantha** *Oliv.* F.T.A. 1 : 166 (1868) ; Chev. Bot. 54 ; Staner l.c. 124 ; Aubrév. l.c. 2 : 292, t. 242. *G. barteri* Oliv. l.c. ; F.W.T.A., ed. 1, 1 : 237, partly (excl. syn. *G. kerstingii* Engl.). *G. chevalieri* Engl. Bot. Jahrb. 55 : 390 (1919). *G. chevalieriana* Hochr. in Ann. Conserv. Jard. Bot. Genèv. 21 : 67 (1919). Forest tree, to 70 ft. high ; flowers cream, with pink pedicels.
Port.G.: Catio (Oct.) *Esp. Santo* 2188 ! **Fr.G.:** Kouria (Oct.) *Chev.* 15025 ! Dalaba-Diaguissa Plateau *Chev.* 18743 ! **S.L.:** Limba (fr. Apr.) *Sc. Elliot* 5625 ! Maria, R. Scarcies (fr. Feb.) *Sc. Elliot* 4802 ! Kambia, Magbema (Dec.) *Jordan* 759 ! Njala (fl. Oct., fr. Feb.) *Deighton* 1410 ! 3118 ! Gola Forest (fr. Jan.) *Unwin & Smythe* 60 ! **Lib.:** Gbanga (Oct.) *Linder* 1239 ! **Iv.C.:** Sanvi *Chev.* 16309 ! Massa-Me *Aubrév.* 137 ! **G.C.:** Tarquah Dist. (Aug.) *Vigne* 209 ! 221 ! Ancobra R. (Dec.) *Johnson* 921 ! **N.Nig.:** Kurmin Damisa, Jemaa (Nov.) *Keay & Onochie* FHI 21729 ! **S.Nig.:** Epe *Barter* 2293 ! Okomu F.R. (fr. Feb.) *Brenan* 9040 ! Sapoba *Kennedy* 416 ! 1419 ! Nun R. (Sept.) *Mann* 488 ! Brass *Barter* 31 !

1830! **Br.Cam.:** Likomba (Nov.) *Mildbr.* 10685! Bali-Ngemba F.R. (fr. May) *Ujor* FHI 30370! **F.Po:** 4,000 ft. (Dec.) *Mann* 583! Also Gabon, Belgian Congo, Tanganyika, N. Rhodesia and Angola. (See Appendix, p. 92.)

[The following species have also been named *G. polyantha* Oliv., but differ by their larger male flowers, with 20–30 stamens in each bundle :—**S.Nig.:** R. Ata, Obudu, 4,000 ft. (Dec.) *Keay & Savory* FHI 25060! **Br.Cam.:** L. Bambulue (Jan., Feb.) *Keay* FHI 28358! *Tiku* FHI 22158! Njinikom, Bamenda (Apr.) *Maitland* 1489! These may represent a distinct species.]

G. ovalifolia *Oliv.* F.T.A. 1 : 166 (1868) ; Chev. Bot. 54 ; Staner l.c. 129 ; Aubrév. Fl. For. Soud.-Guin. 148, t. 149. *G. kerstingii* Engl. Bot. Jahrb. 40 : 558 (1908). *G. acuminata* A. Chev. Bot. 52 (*fide* Hutch.). *G. barteri* of F.W.T.A., ed. 1, 1 : 237, partly. Shrub or tree to 30 ft. high ; flowers white ; fruit yellow ; in fringing forest in the savannah regions (typical plant) ; see note below.

Fr.Sud.: Sikasso *Vuillet* 493. **Fr.G.:** Ditinn (fr. Mar.) *Chev.* 13579! R. Niger, Farana (Jan.) *Chev.* 20483! **S.L.:** *Sc. Elliot*! **Iv.C.:** Niangbo *Aubrév.* 1706! Bobo Dioulasso *Aubrév.* 1849. **Togo:** Sokodé (fl. Dec., fr. Mar.) *Kersting* 16 ; 46. Auae (fr. Jan.) *Kersting* 225. **Dah.:** Natitingou *Aubrév.* 827. **N.Nig.:** Nupe *Barter* 807! Kontagora (Dec.) *Dalz.* 114! Kafuna, Kaduna (Dec.) *Meikle* 785! Anara F.R. (Nov.) *Keay* FHI 21695! Bauchi Plateau *Batten-Poole* 259! **S.Nig.:** Western Lagos *Rowland*! Ikwette, Obudu (Jan.) *Keay & Savory* FHI 25270! Also in Ubangi-Shari, French Cameroons, Gabon and Belgian Congo (*fide* Staner *l.c.*). (See Appendix, p. 92.)

[I am not satisfied that the broad view of this species adopted by Staner (l.c.) is correct. The following specimens of a rain forest tree (to 80 ft. high) agree with material from the Belgian Congo cited by Staner as *G. ovalifolia* Oliv., but appear to me to differ significantly from the typical plant :—**S.Nig.:** Okomu F.R. (fl. Jan.–Mar., fr. Feb.) *A. F. Ross* 241! *Ross* 154! *Brenan* 8881! 9067! 9107! *Akpabla* 1092!]

9. **G. punctata** *Oliv.* F.T.A. 1 : 167 (1868) ; Staner l.c. 138. A tree, 15–30 ft.

S.Nig.: Oban *Talbot* 1336! 1637! **Br.Cam.:** Johann-Albrechtshöhe *Staudt* 446! 509! Also in French Cameroons, Gabon, Belgian Congo, Angola and N. Rhodesia.

10. **G. mannii** *Oliv.* F.T.A. 1 : 167 (1868) ; Staner l.c. 142, 157 ; F.W.T.A., ed. 1, 1 : 237, only in part. *G. obanensis* Bak. f. in Cat. Talb. 9 (1913).

S.Nig.: Oban *Talbot* 1334! Ikom (Nov.) *Catterall* 57! **Br.Cam.:** Ambas Bay (Jan.) *Mann* 711! Also in French Cameroons, Spanish Guinea and Gabon. (See Appendix, p. 91.)

11. **G. brevipedicellata** (*Bak. f.*) *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 237 (1927) ; Kew Bull. 1928 : 228 (1928). *G. mannii* var. *brevipedicellata* Bak.f. in Cat. Talb. 8 (1913). A tree, 20–25 ft. high ; "centre of flower dark-red ; filaments orange ; sepals pale green."

S.Nig.: Oban *Talbot* 1503! 1591! **Br.Cam.:** Kumba Dist. (fr. July) *Olorunfemi* FHI 30687!

12. **G. afzelii** *Engl.* Bot. Jahrb. 40 : 570 (1908). *G. antidysenterica* A. Chev. Vég. Util. 6 : 445 (1911) ; Chev. Bot. 53 ; Staner l.c. 157. *G. mannii* of F.W.T.A., ed. 1, 1 : 237, partly. *G. mimfiensis* of Aubrév. Fl. For. C. Iv. 2 : 292, t. 242, 4–10, not of Engl. A tree, to 50 ft. high ; flowers pale green or greenish-yellow.

Fr.G.: Sanan Plateau *Pobéguin* 2217! **S.L.:** *Afzelius*. *Dawe* 570! Kafiu (Jan.) *Sc. Elliot* 1604! Erimakuna (Mar.) *Sc. Elliot* 5185! Baboo Farm (young fr. Apr.) *Sc. Elliot* 5816! Buyabuya, R. Scarcies (Feb.) *Sc. Elliot* 4548! Colonial Reserve (Jan.) *King-Church* 6! Musaia (Dec.) *Deighton* 4563! Bintumane, 3,000 ft. (Jan.) *Glanville* 459! **Iv.C.:** Danané (Apr.) *Chev.* 21200! Anoumaba (Nov.) *Chev.* 22412! Yabouakrou to Tingouela (Dec.) *Chev.* 22571! Abidjan (May) *Aubrév.* 96! **G.C.:** Adamsu *Vigne* 3498! Fuller Falls, Kintampo (Nov.) *Andoh* FH 5415! **S.Nig.:** Awba Hills (Dec.) *Jones* FHI 4877!

13. **G. epunctata** *Stapf* in J. Linn. Soc. 37 : 86 (1905) ; Staner l.c. 140. *G. mannii* of F.W.T.A., ed. 1, 1 : 237, partly, not of Oliv. Very similar to the last species.

S.L.: Gola Forest (May) *Small* 665! **Lib.:** Sinoe Basin *Whyte*! Dukwia R. (Sept.) *Cooper* 367! Also in Belgian Congo.

Besides the above, the exotic *G. mangostana* Linn. is cultivated in our area.

Imperfectly known species.

1. **G. laurifolia** *Hutch. & Dalz.* F.W.T.A., ed. 1, 1 : 236 (1927) ; Kew Bull. 1928 : 228 (1928). Flowers not known.

S.L.: Ninia, Talla Hills (young fr. Feb.) *Sc. Elliot* 4806!

2. **G. conrauana** *Engl.* Bot. Jahrb. 40 : 562 (1908), partly (excl. *Zenker* 2552) ; Staner l.c. 123.

Br.Cam.: Bangwa (Jan.) *Conrau* 54.

3. **G. smeathmannii** (*Planch. & Triana*) *Oliv.* F.T.A. 1 : 168 (1868). *Rheedia smeathmannii* Planch. & Triana (1860). Probably a form of *G. polyantha* (agg.) but as this group requires more thorough revision I have not replaced the well-known name.

S.L.: *Smeathmann*!

Excluded species.

G. nobilis *Engl.* Bot. Jahrb. 40 : 566 (1908). The specimen (*Talbot* 1385) cited as this species in F.W.T.A., ed. 1, 1 : 236, is **Salacia alata** *De Wild.*